

THE UNIVERSITY OF ALABAMA AT BIRMINGHAM SCHOOL OF MEDICINE

DEPARTMENT OF PATHOLOGY DEPARTMENT PROFILE 2013

CONFIDENTIAL



I. UAB AND THE SCHOOL OF MEDICINE

I. UAB AND THE SCHOOL OF MEDICINE



Known for its innovative and interdisciplinary approach to education and research at both the graduate and undergraduate levels, the University of Alabama at Birmingham (UAB) is an internationally renowned public research university and academic medical center, and the state of Alabama's largest single employer. UAB has rapidly become one of the state's largest public universities with a College of Arts and Sciences that includes a School of Education; eight professional schools (Business, Dentistry, Engineering, Health Professions, Medicine, Nursing, Optometry, and Public Health); a large graduate school; and an acclaimed medical center.

UAB is a relatively young institution whose leadership recognized early on the value in research to be done by collaborative teams with diverse expertise. As a result, UAB embraced the concept of university-wide centers to support the work of multi-disciplinary teams of investigators in the late 1960s, thereby creating a tradition of genuine collaboration focused on solving biomedical problems in many areas, most noteworthy in cancer, arthritis, cardiovascular disease, and AIDS, to name a few. Complemented by a shared entrepreneurial spirit, UAB clinicians, educators, and investigators are encouraged to vigorously explore the novel, take risks and think out of the box.

Classified by the Carnegie Foundation for both "very high research activity" and "community engagement" a designation held only by the nation's top 51 public or private universities, and no other in Alabama – UAB received \$413 million in FY2012 in research grants and contracts and ranks 21st nationally in funding from the National Institutes of Health and 32nd in total federal

research funding. With over 18,000 students, more than 18,000 employees and an annual economic impact that exceeds \$5 billion on the Birmingham area, UAB offers unparalleled opportunities for teaching, research, scholarship, and service. According to the 2012 survey of The Best Places to Work for Postdocs conducted by The Scientist, UAB was 1st among all public universities nationwide and 16th among all universities surveyed. UAB has been named four consecutive years among the top 10 universities nationally for diversity in The Princeton Review. UAB is among the top 100 universities internationally for life sciences according to Academic Ranking of World Universities. It is also home to the largest hospital in Alabama and one of the largest in the United States. It is the only medical center in Alabama listed in U.S. News & World Report "Best Hospitals" 23 straight years – since the issue's inception.

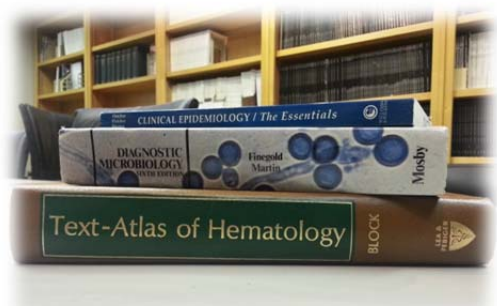
UAB continues to attract the best and brightest students from Alabama, the nation, and 109 countries around the world. *The Princeton Review* has called UAB "a truly great American melting pot of different cultures, religions, and races" and ranked the university third nationally in "diverse student population." UAB students continue to garner prestigious national and international scholarships, fellowships, and other awards. UAB students have claimed Goldwater Scholarships, UNCF/Merck Scholarships, William Jefferson Clinton Scholarships, Alpha Lambda Delta Graduate Fellowships, Benjamin Gilman Scholarships, National AIDS Memorial Grove's Young Leader Scholarship, William Jefferson Clinton National Hunger Leader Award, Teach for America Award and an Afya Bora Fellowship in Global Health. In total, UAB students have won 145 of these awards since 2004.

UAB – SCHOOL OF MEDICINE

For six decades, the UAB School of Medicine (SOM) has emerged as a national leader in medical education, research, and clinical care. Not only does it provide care for the Birmingham area, but it is also a regional and national force in healthcare, attracting nationally recognized physician scientists. Patients come from all parts of the southeast and the rest of the United States to seek out specialist care at UAB.

UAB is locally, regionally, nationally and internationally recognized as a leader in clinical care with programs that are consistently listed in the U. S. News and World Report's annual "America's Best Hospitals" issue and physicians who are consistently listed in the prestigious publication, "Best Doctors in America." Additionally, in 2011, the School of Medicine was one of three finalists for the Spencer Foreman Award for Outstanding Community Service from the Association of American Medical Colleges. This is one of the highest awards given to a medical school, a recognition that reflects UAB's commitment to serving the community.

MEDICAL EDUCATION



In 2007, the SOM adopted a new curriculum that increased preclinical course integration, providing students with opportunities to better prepare for the practice of medicine in the 21st century. The objective of this new curriculum is for students to learn basic sciences in a more clinically relevant context - teaching them to think comprehensively about organ function and diseases rather than simply memorizing mountains of facts. Organ-based modules are co-directed by basic scientists and clinicians.

Since establishment, the SOM has had a tri-campus structure. The basic science program is provided for all predoctoral medical students on the school's main campus in Birmingham, with the clinical program being provided for each class at the three campuses as follows: Birmingham (110 students), Huntsville (35 students), and Tuscaloosa (35 students). In May, 2014 a fourth campus (third regional campus) will open in Montgomery with 6-10 students; thereafter up to 20 students per year will be assigned to the Montgomery campus, ~98 to Birmingham, and ~34 to Huntsville and Tuscaloosa. The program is accredited by the Liaison Committee on Medical Education (LCME), which approves all programs in medical education in the United States and Canada. The school went through its most recent accreditation in 2006, when it was accredited for the maximum time of eight full years. In their report, the LCME identified many areas of institutional strength that reflect the benefits of the collaborative nature of UAB. Among the areas of strength highlighted were:

- The development of a collaborative strategic planning process for education and research
- A faculty and institutional leadership dedicated to the educational mission, both accessible and responsive to students
- Obvious collegiality among chairs, faculty, and campuses contributing to institutional success
- Exceptionally supportive leaders of the clinical enterprise committed to the academic programs
- The Volker Hall facility providing a conducive, student learning environment
- A robust research enterprise creating a pervasive academic environment and contributing to high quality educational opportunities

There are more than 1200 full-time School of Medicine faculty on the Birmingham campus, 879 medical students, and more than 900 trainees (residents and fellows) enrolled in 82 ACGME-accredited programs, 5 Board Approved (non-ACGME-accredited) programs, and 3 dental programs.

GRADUATE EDUCATION

UAB SOM graduate students in the biomedical sciences are provided extensive institutional resources and high caliber of training to become exceptionally competitive for outstanding postdoctoral and professional positions. There are many opportunities for collaborative study and research, and integral to that is the Graduate Biomedical Sciences (GBS) Program. Within the GBS Program, interdisciplinary training pathways are offered in: Biochemistry and Structural Biology; Cancer Biology; Cell, Molecular and Developmental Biology; Genetics and Genomic Sciences; Immunology; Microbiology; Neuroscience; and Pathobiology and Molecular Medicine. UAB offers an NIH funded Medical Scientist Training Program, a combined MD/PhD program, designed to prepare students for careers that combine laboratory investigation of disease mechanisms with the practice and teaching of clinical medicine in an academic setting. The GBS community encompasses approximately 400 graduate students and 280 faculty. Their affiliation with the GBS interdisciplinary thematic programs listed above integrates the departments in the SOM, partner Schools throughout the university, the Southern Research Institute and the HudsonAlpha Institute for Biotechnology.

RESEARCH

Research is a core priority of the University and the School of Medicine. The university offers a robust and inclusive research-intensive environment for the training of medical students and other trainees at all levels. UAB research grant and contract funding totaled \$413M in FY2012. UAB is ranked 32nd nationally in federal research funding, 21st in NIH funding (450 awards) and 10th among NIH-funded institutions in number of active Center grants. The Carnegie Foundation classifies UAB as an institution of “very high research activity” and more than 80% of UAB PhDs are awarded in the STEM disciplines, including ~60% in the life and biomedical sciences.

The School of Medicine holds approximately 3/4 of overall UAB research support, at \$275M in FY12 (\$61M in the JHS departments and \$241M in the clinical departments). NIH funding exceeded \$143M, FY12. This funding includes support of several major NIH-funded Centers, including the Center for Clinical and Translational Science (CCTS), the Comprehensive Cancer Center (which holds four NIH SPORE grants), the Comprehensive Neuroscience Center (which holds one of four national NIH Neurosciences Interdisciplinary Center Grants), and the Diabetes Research and Training Center (one of six nationally). The funding for these and many other UAB Centers and Cores is leveraged through the University Wide Interdisciplinary Research Centers (UWIRC) program. To be considered for University matching funds, UWIRCs must be sponsored by more than two schools and be competitively reviewed based on substantive interdisciplinary faculty involvement, provision of research infrastructure, an adequate financial base, and leadership in areas of community outreach or partnerships. The SOM is an active partner in 21 of the 22 UWIRCs, which received \$4.5M in University support in FY12.



Extensive infrastructure and research trainee resources support the SOM research mission. The SOM occupies ~2.4M ft² net assignable space. Five new research buildings have been completed since 2006. Major renovations have been completed or are in progress in 24 additional sites, including completion of a zebra fish facility and imminent completion of renovation for the Comprehensive Cancer Center, which will house the most powerful cyclotron in a U.S. academic medical center. Internal research incentive resources include a multi-year commitment of >\$185M through the AMC21 Research Strategic Plan, with \$26.8M invested in faculty recruitment and program enhancements to date, and \$81M committed to multi-year facility improvements.

As with biomedical research institutions and faculty nationwide, the decline and uncertain future of NIH and other federal and state support have affected the UAB research enterprise. Since 2006 total UAB research support has decreased 10%, including a 15% decrease in NIH support. To address NIH constraints, the AMC21 strategic plan includes a new Bridge Funding Program to aid retention of productive faculty, and enhances competitiveness of SOM investigators through its Individual and Multi-Investigator Pilot Awards. It also has leveraged new philanthropic

support of >\$25M through a SOM matching initiative, thereby strengthening funding diversity. Alliances with the Southern Research Institute, HudsonAlpha Institute for Biotechnology (Huntsville) and the Alabama Drug Discovery Alliance also contribute to research and faculty capacity. Construction of additional research space is planned to accommodate projected hiring of up to 80 new faculty members, in addition to on-going renovation of existing facilities. A strong information systems structure is a critical need and is in development through the establishment of the Informatics Division within the Department of Pathology and the work of an Informatics Strategic Planning committee.

CLINICAL CARE

The UAB Health System is the largest comprehensive medical network in the state. In Birmingham, the Health System, referred to as UAB Medicine, is comprised of University Hospital (Main and Highlands campuses), the UAB Callahan Eye Hospital and several outpatient facilities, including The Kirklin Clinic, The Kirklin Clinic at Acton Road, and community-based UAB Health Centers in Hoover, Hueytown, Inverness and Moody. UAB clinicians provide patient care at the Birmingham Veterans Administration Medical Center; Cooper Green Mercy Hospital, a county owned and operated facility; and at Children's of Alabama Health System facilities, including the hospital that is adjacent to the UAB campus and the Children's South Pediatric Outpatient Clinic (Children's South).



University Hospital, the school's primary teaching hospital, is the centerpiece of the medical center, and the largest hospital in Alabama, with more than 1157 beds, serving approximately 47,000 patients each year. It houses the state's only Level I trauma center and the only Level III NICU in the region. In 2002, University Hospital achieved recognition as one of only eight Magnet hospitals in the southeastern U.S., a designation awarded by the American Nurses Association. Since that time, it has gained the re-designation status twice. Students and faculty at UAB's outpatient clinics see more than 300,000 patients per year and the

hospital handles over 50,000 emergency room visits. The UAB Callahan Eye Hospital provides specialty eye care on a world class level and is recognized internationally for its research and clinical care. The Kirklin Clinic is a five story, 454,000 square foot facility, providing outpatient services in primary care and all specialty services. UAB Medicine continues to grow, assuring a commitment to world-class care for patients across Alabama and throughout the world.

LOCAL HEALTHCARE MARKET

UAB Medicine is located in the heart of the Birmingham-Hoover Metropolitan Statistical Area (MSA), a region with a population of 1,128,047 as of the 2010 U.S. Census and ranked as the 49th largest metropolitan area in the nation. The Birmingham-Hoover MSA is comprised of seven counties: Bibb, Blount, Chilton, Jefferson, Shelby, St Clair, and Walker. The City of Birmingham is in Jefferson County. Healthcare is a major service industry in the region, employing approximately ten percent of the City of Birmingham's workforce. The region boasts 15 adult inpatient hospitals, one pediatric hospital, multiple hospital-sponsored community health centers, outpatient centers, an array of specialty treatment centers and private physician practices. In addition to UAB, area health facilities in the region include: the St. Vincent's Health System, the Children's of Alabama Health System, Cooper Green Mercy Hospital, Trinity Medical Center, Brookwood Medical Center, the Baptist Health System, the Birmingham Veterans Administration Medical Center, and the Chilton Medical Center.

STRATEGIC PLANS AND PRIORITIES



A new planning process, designated AMC21 (Academic Medical Center for the 21st Century), was initiated in 2011 to develop an integrated strategic plan for each of the entities comprising the UAB medical enterprise: the SOM, the UAB Health System and the clinical practice plan (UA Health Services Foundation [UAHSF]), the three constituents of which were collectively designated UAB Medicine. AMC21 is a continuing, dynamic strategic planning and implementation process, the intent of which is to build on the strengths of each entity, to agree on areas that need strengthening, and to commit collective resources to sustainable excellence in each mission area. Insights from faculty, staff, and executive-level administration representing the SOM, the Health System, the HSF, University Hospital, and the regional campuses and programs were included to craft a comprehensive plan reflective of a shared commitment to achieve the following:

- Educate the next generation of physicians and biomedical scientists who are leaders in their fields
- Undertake discovery research to elucidate mechanisms of disease that lead to new disease-modifying, curative, and eventually preventive treatments
- Provide outstanding, compassionate medical care for our patients utilizing the knowledge gained from leading-edge science
- Serve our community through actively engaged faculty, trainees/students, staff and alumni in Alabama and around the globe
- Become the “Preferred Academic Medical Center of the 21st Century”
 - The plan addresses nine thematic priority areas:
 - Cancer
 - Cardiovascular Diseases
 - Diabetes, Obesity & Metabolism
 - Immunology & Autoimmunity
 - Neurosciences
 - Transplantation
 - Infectious Diseases & Global Health
 - Primary Care
 - Medical Education

These are undergirded by 7 cross-cutting research infrastructure and technology platforms, including

- Biorepositories
- Genomics & Proteomics
- Biomedical Informatics
- Imaging
- Graduate & Postdoctoral Education
- Outcomes & Health Disparities
- Clinical & Translational Science

Steering committees on behalf of each area submit proposals annually for SOM investments in targeted initiatives. Through this process, which includes biannual formal progress reports in each mission and priority area, support of faculty recruitment and retention, new department creation and enhancement, facility improvements, advances in clinical services and educational programs, and formation of key partnerships have been achieved.

II. DEPARTMENT OVERVIEW

II. DEPARTMENT OVERVIEW



The UAB Department of Pathology is recognized nationally for excellence in both undergraduate and graduate medical education and outstanding clinical pathology practice in multiple areas including bone pathology, cytopathology, embryo-fetal pathology, transfusion medicine and head and neck pathology while housing dynamic research programs in multiple areas of experimental pathology. The Department is home to over seventy full-time primary faculty members in six divisions: Anatomic Pathology, Forensic Pathology, Informatics, Laboratory Medicine, Molecular and Cellular

Pathology, and Neuropathology. The Department is widely recognized as one of the leading academic departments of pathology in the country. The Department has approximately \$20 million per year in extramural research funding and consistently ranks in the top twenty departments of pathology for National Institutes of Health grant funding. Research programs in bioenergetics, cardiovascular disease, immunology, informatics, neuropathology and redox biology are among our many areas of scientific strength. Our graduate student, resident and fellowship training programs are among the finest in the country and our faculty and students have received national and international recognition for their research and teaching accomplishments. This review summarizes the departmental progress since 2008 when Dr. Kevin Roth took over its leadership and describes our successes and challenges in fulfilling our vision and mission:

Vision: To be recognized internationally as a leader in pathology integrating education, research and service.

Mission: To generate, transmit and apply knowledge to enhance human health.

ACADEMIC PATHOLOGY - OVERVIEW

This review of the UAB Department of Pathology was formulated in the context of the future of pathology as a clinical and research discipline and will serve as a road map by which we can position ourselves at the forefront of this exciting new field. As Special Editor for the American Society for Investigative Pathology (ASIP) Centennial Project, I recently had the opportunity to comment on the future of academic Pathology departments. I will briefly quote from my closing editorial (AJP; 2012; 180:1337-1339).

“Most importantly to both medicine and pathology, “the pace of biomedical discovery will accelerate.” New metabolomic, proteomic, genomic, and epigenetic testing on human specimens combined with detailed electronic health records will revolutionize both clinical practice (precision medicine) and investigative pathology. The boundaries between basic research and medical practice will be blurred, and frequently, mechanistic insights and new hypotheses will be generated from clinically acquired data. Massive data sets derived from genetic testing and large patient populations, (ie, *big data*) will require new approaches to informatics and force us to confront difficult privacy and medicolegal issues regarding data sharing and informed consent. For both diagnostic anatomic pathology and a large portion of investigative pathology that relies on microscopic examination of cells and tissues, new imaging and analytical tools will become integral parts of our professional lives. However, this future will present us with some, perhaps, unexpected and surprising results.”

In this vision for the future of Pathology, it will be critical for the UAB Department of Pathology to position itself as a leader in certain areas and an important collaborative partner in others. The departmental leadership team has identified three critical areas that require substantial resources and intellectual support to achieve our very realistic goal of being the recognized international leader in Pathology integrating education, research and service and fulfill our vision statement. Informatics has emerged as the future key to both clinical and research success in Pathology. We have fully embraced this concept and laid a foundation for future Informatics growth, but must accelerate our departmental and institutional investments to build on this promising start.

Similarly, interdisciplinary and translational research will garner a greater share of the NIH grant portfolio and institutions without an easily accessible electronic health record will be disadvantaged. We are committed to working with the institution to develop an administrative support structure that embraces clinical research. This also requires a robust biorepository program supported by a combination of grants, institutional resources, and clinical applications and this initiative from the Department is being positively supported by the UAB leadership. Pathology is the key driver for these efforts and is strategically positioned to champion both the clinical use of human samples and their appropriately regulated use in translational research.

Finally, we recognized that UAB Medicine must rapidly develop the molecular diagnostic capabilities for both precision medicine and research applications to remain competitive as a leading academic medical center. The Department of Pathology is playing an important strategic role in the decisions needed for the substantial investment in whole genome sequencing capabilities, genomics, proteomics, epigenetic testing, metabolomics and other rapidly developing technologies. The following sections provide an opportunity to assess the strengths and areas for improvement of the UAB Department of Pathology and guide our course for its future success and substantial investment to realize these goals from the School of Medicine.

UAB PATHOLOGY (2008-PRESENT)

A comprehensive Chair search process was started in 2006 upon Dr. Jay McDonald's announcement of his intent to step down as Chair of Pathology. Following on-site visits by approximately ten finalists, Dr. Kevin A. Roth was selected to succeed Dr. McDonald and became Chair of the UAB Department of Pathology on September 1, 2008. Dr. Roth had been the Director of the Division of Neuropathology in the UAB Department of Pathology since 2002. Prior to moving to UAB in 2002, Dr. Roth was a tenured professor at Washington University in St. Louis, Missouri in the Departments of Pathology and Immunology, and Molecular Biology and Pharmacology.

The subsections below will describe various aspects of the UAB Department of Pathology including faculty demographics; progress made over the last five years to address the eight challenges facing the Department as described by Dr. McDonald; provide data on Dr. Roth's effectiveness as a Department Chair, research investigator, and national leader in the discipline of Pathology; compare the performance of the Department of Pathology with other UAB departments in accomplishing our research, clinical and teaching missions; and provide comparison data that permit "benchmarking" of the UAB Department of Pathology with its peer departments nationally.

DEPARTMENT FACULTY

Detailed data regarding the Department of Pathology faculty members and their duties, responsibilities and achievements are provided in various sections of this document. A brief, and incomplete, listing of faculty holding officer positions in National Societies and Organizations (Table 1) further highlights the prominent leadership roles that UAB Pathology faculty members play nationally and emphasizes the department's reputation for excellence. The Department currently has 75 full-time primary faculty members and approximately 352 additional employees (Table 2). The distribution of faculty by division and rank is provided in Table 3.

Table 1

UAB DOP Faculty Leadership in National Societies

Faculty Name	Society	Position
C. Bruce Alexander, M.D.	Academy of Clinical Laboratory Physicians and Scientists	President
	American Society of Clinical Pathologists	Treasurer and President
	AOA Board of Directors	Treasurer and President
Margaret Brandwein-Gensler, M.D.	North American Society of Head and Neck Pathology	President
Victor Darley-USmar, Ph.D.	Society for Free Radical Biology and Medicine	Past President
Gregory Davis, M.D.	National Association of Medical Examiners	Vice President
	American Society for Clinical Pathology	Executive Editor, ASCP Case Reports
	Society for Pediatric Pathology	Councilor-at-Large
Ona Faye-Petersen, M.D.	American Board of Clinical Chemistry	Secretary/Treasurer
Robert W. Hardy, Ph.D.	American Association for Clinical Chemistry	Chair, Southeast Section
Silvio H. Litovsky, M.D.	Society for Cardiovascular Pathology	Treasurer
Robin Lorenz, M.D., Ph.D.	College of American Pathologists	Alabama State Commissioner
	Academy of Clinical Laboratory Physicians and Scientists	President
Marisa Marques, M.D.	American Society of Apheresis	Secretary/Treasurer
Joanne Murphy-Ullrich, Ph.D.	American Society for Matrix Biology	Vice President
		Secretary/Treasurer
Kevin A. Roth, M.D., Ph.D.	American Society for Investigative Pathology	Councilor
Gene P. Siegal, M.D.	Arthur Purdy Stout Society of Surgical Pathologists	Vice President
		President-Elect
Gary T. Simmons, M.D.	National Association of Medical Examiners	Past-President
Majd Zayzafoon, M.D., Ph.D.	American Society of Bone and Mineral Research/Advances in Mineral Metabolism	Board of Directors
		Executive Board Member

Table 2. Departmental Faculty Profile

Division	Totals	Professor	Assoc. Prof.	Asst. Prof.	Instructor
Administration	4	3	1		
Anatomic Pathology	24	11	6	7	
Forensic Pathology	3	2	1		
Informatics	4	1		3	
Laboratory Medicine	12	10		2	
Molecular and Cellular Pathology	24	10	9	3	2
Neuropathology	4	1	1	2	
Total Faculty	75	38	18	17	2

Department Staff and Associates

Residents and Fellows	35
Postdoctoral Fellows and Trainees	18
Graduate Students	54
Visiting Scientists	13
Student Assistants	23
Administrative Staff	51
Research/Lab Staff	<u>83</u>
	277

Total employees 352

Table 3. Faculty Rank by Division

M.D.

Rank	Anatomic	Lab Medicine	Neuropath	Forensic	Molecular & Cellular	Informatics	Admin	Total
Professor	10	6	1	2	0	0	2	21
Associate Professor	5	0	1	1	0	0	1	8
Assistant Professor	7	2	1	0	0	1	0	11
SUBTOTAL	22	8	3	3	0	1	3	40

Non-M.D.

Rank	Anatomic	Lab Medicine	Neuropath	Forensic	Molecular & Cellular	Informatics	Admin	Total
Professor	1	4	0	0	10	1	1	17
Associate Professor	1	0	0	0	9	0	0	10
Assistant Professor	0	0	1	0	3	2	0	6
Instructor	0	0	0	0	2	0	0	2
SUBTOTAL	2	4	1	0	24	3	1	35
DIVISION TOTALS	24	12	4	3	24	4	4	75



In 2008, the department had 82 faculty and declined to just 65 in 2011 before reaching its current level of 75 in 2013. The decrease was precipitated by several factors including career advancement opportunities, retirements, and the closure of the Human Gene Therapy Center which was jointly operated by the Departments of Pathology, Surgery, Medicine, and Obstetrics/Gynecology, and resulted in the departure of four primary Pathology faculty. Recent growth resulted from the establishment of the Division of Informatics and recruitment of both clinicians and basic science researchers. Faculty turnover

in the department has been substantial over the last five years. There have been approximately 35 departures and 35 hires since 2008.

CHAIR ACCOMPLISHMENTS

Under my leadership as Chair of the UAB Department of Pathology, there are a significant number of personal and departmental successes that have been achieved in the last five years. Key areas of successful strategic development are listed below.

Programmatic:

- Established a Division of Informatics and recruited Dr. Jonas Almeida as its founding Director. The Division has rapidly grown and developed a reputation for innovation and received international recognition.
- Funded a Mitochondrial Medicine Laboratory under the direction of Dr. Victor Darley-Usmar. This novel laboratory has as its mission to apply state of the art approaches in mitochondrial biology to the development of Precision Medicine and advancement of translational research.
- In collaboration with the SOM and UAB Health System, have begun the significant expansion of our Biorepository Program including identification and future recruitment of new leadership, CAP accreditation and CLIA certification.

Clinical:

- Relocated Cytopathology and Anatomic Pathology subspecialty services to new facilities in HSB.
- Lobbied and gained approval for implementation of Professional Component Billing.
- Successfully negotiated the phase out of a HSF assessment fee to the Department of Pathology.
- Negotiated a new Part A contract with the Hospital that acknowledges and fairly compensates the Department for operational changes that have occurred since 2008.
- Established a Community Practice Pathology Program that recently signed a contract with Baptist Health System – Montgomery starting on October 1, 2013.

Research:

- Substantially improved research laboratory space (increased the amount of renovated or new laboratory space from approximately 25% to 43% of our total research space).
- Successfully recruited multiple new NIH funded research focused faculty from outside institutions and retained multiple NIH funded investigators internally.
- Able to keep the Department of Pathology in the top twenty NIH funded departments nationally.

General:

- Increased faculty diversity (approximately 50% of all new faculty hires since 2008 have been women; increased the number of African-American faculty from one in 2008 to three in 2013).
- Secured funding and established six new endowed professorships.
- I have been able to stabilize departmental reserves.

Personal:

- Very high Department of Pathology faculty support for my performance as Chair. My overall “approval” ratings in both 2011 and 2013 were over 80% with fewer than 10% expressing a lack of confidence in the Chair.
- Ranked in the top 30 best funded NIH Pathology Investigators nationally in 2010.
- Principal Investigator on a \$1.0M ARRA award in 2010.
- Regular member of NIH NOMD Study Section
- Special Editor, ASIP Centennial Project.
- Carpenter-Rasch Award from the Histochemical Society.
- Editor-in-Chief, *The American Journal of Pathology*
- Personal H-index of 65 (i.e. 65 of my publications have been cited at least 65 times each).
- President-elect, the American Society for Investigative Pathology, 2013.
- Chair-elect, NIH NOMD Study Section.

Challenges, Weaknesses, and Areas for Improvement:

- Despite 44 approved ACGME resident and fellow positions, we have only been able to obtain Hospital support for 33 positions.
- Continuing negotiations with Hospital and Health System Leadership to provide Mission Support funds to the Department of Pathology to address clinical operational needs which have not been successful to date.
- The level of state support to the Department of Pathology through the ASETF allocation formula has declined significantly since 2008.
- Marked faculty turnover (approximately 35 departures and 35 hires over the last five years).
- Minimal Clinical Outreach Program.
- Steady but relatively modest improvement in our Molecular Diagnostic Capabilities.
- Hospital Laboratory automation still pending.
- We are experiencing multiple challenges at individual and programmatic level in departmental NIH funding at all ranks.

Taken together, the department is now at an important juncture in its history with a motivated and productive faculty which with strategic investment is poised to become a prototype for the next generation of academic Pathology Departments.

METRICS AND BENCHMARKS

UAB Comparisons

The Department of Pathology is considered both a Joint Health Science (JHS) Department (one of seven in the SOM) and a Clinical Department (one of approximately 15 in the SOM). Based on SOM AMC21 2013 data, the Department of Pathology had 71 faculty which represents 5.6% of the total SOM faculty (1279). For some metrics it is best to compare the Department of Pathology's performance with JHS Departments and in other measures, with Clinical Departments.

The recent announcement of 2013 Argus Award nominees and winners (voted on by the medical students) provides an approximation of relative departmental teaching performance. I am pleased to report that despite representing only 5.6% of the SOM faculty, 17% of the Argus Award nominees and 33% of the winners were from the Department of Pathology. From the metrics available, and as extensively documented in Section V, Education, I feel that the UAB educational mission is being well served by the Department of Pathology



Departments of Pathology are not included in U.S. News and World Report Hospital Rankings, so cross comparisons with other UAB clinical subspecialties cannot be made using this metric and we need to use alternative measures. Based on the high scores that laboratory services and anatomic pathology have received in previous UAB SOM Physician surveys and the fact that more than half of our anatomic pathologists are listed as “Best Doctors in America”, I am confident that we are meeting our clinical mission at a level of performance equal to or above that of other clinical departments.

On the research side, substantial data exists to provide relative performance comparisons between UAB SOM Departments. Based on publicly available data (Blueridge Institute for Medical Research), the Department of Pathology is ranked first for UAB JHS Departments in 2012 NIH funding (Table 4) and second for UAB Clinical Departments (Table 5). Compared to all UAB SOM Departments, the Department of Pathology submitted the second most NIH grant applications in 2013, the third most total grant submissions (all funding agencies) in 2013 and ranked third overall for most funded investigators (Table 6). When these numbers are adjusted for number of departmental faculty, despite being only 5.6% of SOM faculty, the department had 7.5% of the SOM funded faculty and submitted 14% of the NIH grant applications in 2013.

Thus, this brief comparison of teaching, clinical and research effectiveness suggests that the Department of Pathology is performing at or near the top of all UAB Departments in these categories.

Table 4.

Joint Health Sciences Departments
NIH Grant Funding
(2012 BRIMR)

Rank	Department	\$ (M)	National Rank	# Departments Nationally
1	Pathology	11.0	16	97
2	Microbiology	9.1	32	119
3	CDIB (Cell Bio/Physiology)	8.4	15/15	78-Anat./CB 84-Physiology
4	Neurobiology	5.1	23	43
5	Biochemistry	4.3	47	104

Table 5.

Clinical Departments
NIH Grant Funding
(2012 BRIMR)

Rank	Department	\$ (M)	National Rank	# Departments Nationally
1	Medicine	64.6	18	112
2	Pathology	11.0	16	97
3	OB/GYN	9.1	2	69
4	Pediatrics	7.9	33	84
5	Neurology	4.3	31	76

Table 6.

UAB SOM Grant Data
(SOM AMC21: Department Level
Outcomes Data)

2013 NIH Grant Submissions		
Department	Number	% SOM
Medicine	125	32
Pathology	54	14
Microbiology	33	8.4
2013 All Grant Submissions		
Department	Number	% SOM
Medicine	455	39
Pediatrics	109	9.4
Pathology	104	9.0
SOM NIH Funded Investigators		
Department	Number	% SOM
Medicine	61	29
CDIB	17	8.0
Pathology	16	7.5

NATIONAL COMPARISONS

To determine if the UAB Department of Pathology was performing at a reasonable level nationally, we gathered data on ten peer institutions from publically available sources (Blueridge Institute of Medical Research, 2012 NIH data; U.S. News and World Report, 2013-2014 Hospital Rankings; and institutional/departmental websites). The ten peer institutions chosen for comparison are shown in Table 7. The ten comparison schools are referred to as “Group Ten” schools and Group Ten means are provided in the tables below. Collected data include SOM class size, SOM-affiliated Primary Adult Hospital data including beds, admissions, ER visits, in-patient surgeries, out-patient surgeries, surgical pathology volume, numbers of faculty, residents, fellows, and NIH funding data for both the institution (SOM) and their Departments of Pathology. The Group Ten schools had on average 11.0 U.S. News and World Report Ranked specialties compared to only three at UAB. The number of ranked plus high performing specialties averaged 13.9 for Group Ten schools and UAB had 13 such specialties. This level of analysis allows comparison of the UAB Department of Pathology to a peer group with similar clinical, teaching and research missions. Based on SOM class size and clinical volumes, UAB is very similar to the Group Ten mean (Table 8) and would presumably require a similar number of faculty and staff to accomplish a similar teaching and clinical mission. A striking and alarming statistic, is that the UAB Department of Pathology has 41% fewer faculty, 11% fewer residents, and 27% fewer fellows to accomplish its mission compared to its peer departments (Table 9). This is clearly an area in which substantial progress needs to be made over the next five years.

Table 7.

**Group Ten
Schools of Medicine**
(listed in relative NIH funding rank order)

Washington University
University of Pittsburgh
University of Michigan
Duke University
Stanford University
Vanderbilt University
University of North Carolina
Emory University
Case Western Reserve University
Indiana University

Data Sources:

- ◆ Blueridge Institute of Medical Research (2012 NIH data)
- ◆ US News and World Report, Hospital Rankings (2013-2014)
- ◆ Institution Websites

Table 8.

Group Ten Comparison						
	SOM				Surgery (k)	
	Class Size	Beds	Admissions (k)	ER Visits (k)	In-Patient	Out-Patient
Group Ten Mean:	150	975	43.6	84.7	18.8	17.7
UAB:	176	1,062	45.2	78.2	19.9	13.0
(UAB as % Mean):	(117)	(109)	(104)	(92)	(106)	(73)

Table 9.

	Department of Pathology		
	Faculty	Residents	Clinical Fellows
Group Ten Mean:	126	27	15
UAB:	74	24	11
(UAB as % Mean):	(59)	(89)	(73)

To approximate our relative research mission success, we can compare 2012 NIH funding data. It must be stated that research success is more than just NIH rankings, but it is at least one objective measure for comparison. The Group Ten Schools had on average, \$260M in SOM NIH funding in 2012 and an average ranking of 15 compared with UAB funding of \$143M and an NIH rank of 29. Thus, UAB SOM had approximately 45% less NIH funding than the comparison group. In contrast, the UAB Department of Pathology had \$11M in NIH funding and a rank of 16, while the Group Ten Departments of Pathology had an average of \$12.2M in NIH funding and a mean rank of 20.

Another way to assess performance is by measuring relative market share. At UAB, the Department of Pathology contributes 7.7% of the total UAB SOM NIH funding compared with the Group Ten Pathology departments which contribute 5.0% of their SOM total NIH funding. Even more impressively, when one calculates the amount of NIH funding per faculty member, UAB Department of Pathology averages \$149,000 per faculty member compared with the Group Ten average of \$107,000 per faculty member. This per faculty funding level average is second only to Emory's in this highly accomplished set of Departments of Pathology. When all grant support is considered, the UAB Department of Pathology generates \$257,000 per faculty in extramural grant support.

In total, this comparison with our national peer groups, and other UAB Departments, indicates that the UAB Department of Pathology is performing all three of its missions: teaching, service, and research at an exceedingly high level.

2008 "CHALLENGE" LIST

The perspective of our previous chair, Dr. McDonald continues to be valued and he highlighted eight items that would represent challenges for a new Chair upon his retirement. The departmental leadership found this analysis valuable and insightful and detail areas of substantial progress and some remaining challenges.

1. Solve administrative issues between the Hospital and Department, including Part A contract.

Update: Relationships between Hospital and Departmental leadership have improved considerably over the last five years. As an example, we were recently able to establish a new Part A contract with the Hospital that recognized an increase in departmental participation at UAB-Highlands Hospital, the development of molecular diagnostics services and increased testing complexity requiring additional faculty effort. We were able to rapidly evaluate the recommendations of an independent consultant and sign a new Part A contract that represented fair market value.

2. Develop a strong outreach program in partnership with the Hospital.

Update: There has been modest progress on this item and the lack of a robust Outreach program remains a major challenge to the Department's long-term financial success. The Department has recently entered into a contract with Baptist Health System-Montgomery to provide on-site professional services and we hope to further develop a Community Practice Pathology Program to enhance clinical revenues. UAB Health System leadership has been supportive of the Department pursuing this approach and has indicated that "send out tests" referred to UAB Hospital from our Community Practice Pathology Program will be charged competitive technical fees. This may be a small first step in developing a more cooperative strategy with UAB Hospital to compete in the Outreach market.

3. Eliminate the \$600,000 annual "referral fee" selectively implemented by the Health Service Foundation on the Department of Pathology.

Update: Following review by an outside consultant and a unanimous vote of an internal committee of Chairs and Administrators, HSF agreed to phase out this payment over a several year period. The last assessment occurred in 2012. Implementation of this fee between 2008 and the final phase out, cost the Department approximately \$1.5M.

4. Correct Pathology faculty salary deficiencies and hire new faculty to build the department. Funding from 1-3 are required to do this.

Update: As indicated by Dr. McDonald, monies from multiple sources will be required to address this challenge. The new Part A contract and the recent elimination of the HSF assessment fee will help somewhat, but without an Outreach business, progress on salaries will require urgent commitment at the school level since it remains our greatest vulnerability in which some progress is being made.

The UAB Health System is in the process of establishing a Funds Flow system that will use Hospital revenues to support competitive clinical faculty salaries. I am hopeful that Funds Flow allocations to the Department of Pathology will help address this item. The Funds Flow system is to replace the current process by which Clinical Departments receive financial assistance through a combination of Mission Support (provided from a pool of money provided by UAB Hospital, HSF, SOM, and Viva/Triton), Infusion Therapy Contracts and the Common Fund Development Funds. Hopefully, the departmental review evaluation, Funds Flow, and the Department of Pathology's initiation of a Community Practice Pathology Program will provide new revenues to address salary issues going forward.

5. Develop Molecular Pathology and update automation.

Update: The Department has hired new faculty and advocated for new space, equipment, and resources from the Hospital to address what was an inferior molecular diagnostic laboratory. We have made modest progress and the Hospital has promised additional future support. We remain behind our peers in this area.

Automation of the clinical laboratories, including sample bar coding, robotics, and space renovation has been a major need throughout my five years as Chair. Unfortunately, the Hospital was unable to find adequate resources to begin this process until just recently. A plan has been developed and funding allocated to begin lab renovations and automation in 2014. We are behind our peers and community Hospitals in this regard.

6. Build new space for cytology and subspecialty anatomic pathology.

Update: Accomplished. New and completed space in PD6 and HSB is now occupied.

7. Address research space needs.

Update: In cooperation with the School of Medicine, we have made significant improvements in the quality of our assigned research space and we have sufficient space to accomplish our current research objectives.

8. Integrate the department into the new Medical School curriculum and reorganized interdisciplinary graduate program.

Update: This topic is addressed in detail in Section V (Education). Our faculty remain committed to the overall educational goals that motivated these changes, and have played a crucial role in the planning of the changes in the educational mission.

In total, I feel that five “challenges” have been successfully met (1, 3, 6, 7, and 8), significant progress has been achieved on another (5), and two remain as significant concerns (2 and 4).

III. DIVISIONS

III. DIVISIONS

ANATOMIC PATHOLOGY



The largest division in the Department of Pathology, the Division of Anatomic Pathology has been comprised of between 25 and 31 faculty over the last 5 years. This group, the majority of whom are subspecialty trained, diagnose disease based on the examination of cells, tissues and organs from patients. They are organized into 5 sections: Autopsy Pathology, Surgical Pathology, Cytopathology, Molecular Pathology and Translational Research/Biobanking. Two of the current group of 29 faculty also have appointments in the Laboratory Medicine Division, 1 in the Informatics Division, 1 in Dermatopathology and 2 in the Neuropathology Division. Special

interests and expertise include pathology of the heart, GI tract, liver, breast, kidney, male and female genitourinary tracts, non-neoplastic and neoplastic bone, soft tissue, ENT and oral pharynx along with perinatal and hematopathology. The UAB Anatomic Pathology laboratory performs approximately 64,000 evaluations per year, which covers the entire breadth and depth of clinical material, including PAP smears, non-gynecological cytologies and fine needle aspiration biopsies along with several hundred autopsies.

The Division conducts basic, translational and clinical research with the goal of increasing the recognition of organ-directed disease processes and of furthering diagnostic techniques. This research has generated between \$4.5 and \$5.3 million in annual extramural funding over the last 5 years. Critical research programs include those led by Casey Weaver in Immunology, Andra Frost in Breast Pathogenesis and Upender Manne in Colorectal Biomarker Identification. The Cytopathology Section was the recipient of a Centers of Excellence Award, one of six in the country before that designation was abandoned.

Divisional faculty have been the recipients of many awards for teaching excellence from the Schools of Medicine and Dentistry. Laboratories in the Division include immunohistochemistry, FISH and diagnostic molecular biology and a number of Core Laboratories for the Institution run by divisional faculty including those of the Gene Therapy Center's Core Laboratory for Clinical Trials Evaluation, the Metabolic Bone Center's Histomorphometry & Molecular Pathology Laboratory and the Hepatorenal Fibrocystic Disease Core Center. Investigators in the Division, working under the leadership of Professor William Grizzle, operate one of the largest Tissue Procurement/Tumor Banking programs in the world. This includes the Tissue Procurement Core Facility of the UAB Comprehensive Cancer Center, the Southern Division of the NCI Cooperative Human Tissue Network and the NIH Tumor Bank of the Early Detection Research Network.



The Division offers multiple fellowships including experiences in Surgical Pathology, Subspecialty Pathology (Head & Neck, Renal, Musculoskeletal, GI), Cytopathology, Dermatopathology, Molecular Pathology and Hematopathology. Geared to individuals interested in academic careers, residents and fellows are encouraged to participate in on-going research projects in collaboration with the faculty members in the Division. The Division has been recognized for the last several years as among the top 10% of institutions providing accepted abstracts to USCAP Annual Meeting.

FORENSIC PATHOLOGY



The Division of Forensic Pathology has three full-time faculty members who perform clinical and teaching services. Through a contract with Jefferson County, the UAB Forensic Faculty provide pathology medical services for the Jefferson County Coroner/Medical Examiner Office in space located in Cooper Green Mercy Health Services. During 2012, the Medical Examiner's Office performed a total of 1,840 investigations. Of those cases, 468 complete autopsies were performed and 206 detailed external examinations were performed. Most of the cases entail at least one consultation

with law enforcement officials as well as with family members. Faculty in the division are called upon for pre-trial conferences with district attorneys and police to clarify charges on arrest warrants and to provide formal scientific presentations in trials, depositions and/or preliminary hearings. Additionally, they perform death certificate reviews and consultations outside of the immediate jurisdiction.

Dr. Brissie has actively mentored and given our other pathology faculty members time to develop their professional careers. Dr. Davis is currently Vice-President of the National Association of Medical Examiners and on the Board of Directors of the American Academy of Forensic Science. Dr. Simmons has recently completed his second term as a member of the Board of Directors of the National Association of Medical Examiners and continues to serve as the Chairman of the Membership and Credentials Committee.

Funds from a Coverdale Grant Award provided a state-of-the-art portable digital dental x-ray unit with associated computers and software. Budgetary funding was also obtained for state of the art digital radiology equipment which has been purchased and installed.

The Division offers a one-year accredited Fellowship in Forensic Pathology directed by Dr. Davis. The fellow acts as a functioning forensic pathologist and is responsible, under supervision by staff pathologists, for scene investigations, complete postmortem examinations, protocol preparations, conferences with interested parties and actual court testimony. Comprehensive backup in all medical specialties is readily available, as are numerous University educational conferences and opportunities for research and teaching.

The faculty is active in teaching at several levels within the University and community. They provide lectures on environmental pathology with laboratory sessions. Rotations through the Medical Examiner Office are available to students in criminal justice and public health. The faculty are active in the education of pathology house staff and present an organized didactic lecture series to include such topics as postmortem changes, identification of human remains, gunshot wounds, blunt force injuries, etc. They also participate in a number of diverse local and regional presentations which serve both educational and public relations functions.

INFORMATICS



The Division of Informatics was created in January 2011 in recognition of the increasing role of Data Sciences in Pathology. The original plan identified a 5-year foundation period, with adequate resources, for the recruitment of 3 to 5 faculty with research programs spanning the key pillars of the field, from bioinformatics to medical informatics, from software engineering to computational statistics. This configuration is well aligned with the more recent focus on the contextualization of Data Sciences by programs such as NIH's BD2K¹, which propose an approach to quantitative sciences

in Biomedicine that is simultaneously integrative and translational. These wider developments play a major role in refining and framing the mission statement for the division, which calls for systems integration not only at the top (model-based) but also at the bottom (data-driven). As reflected by the success in faculty recruitment, two and a half years into the development of the Division of Informatics it is already clear that contextualizing it within the Department of Pathology was a good gamble.

The initial foundation period was also tasked with establishing informatics infrastructure and training programs attended by graduate students, residents and fellows. A 1-year long fellowship in Informatics is under development, anticipating the emergence of the discipline as a board certified subspecialty². These goals were achieved in half the time originally anticipated, with the recruitment of a 5th faculty in July 2013, completing a faculty body with scholarly achievements fully matching the initial expectations, and covering the breadth of sub-disciplines at the foundation of Informatics as an Academic domain. The corresponding development of interoperable Big Data infrastructure is correspondingly advanced, and is now making its first appearances in patient focused molecular tumor boards. It's noteworthy that this translational reach was achieved in spite, not because, of an existing electronic medical record (EMR) system which lacks in interoperability. This is a typical scenario in large Medical Centers and, consequently, the Division of Informatics is recognized by the institution as an asset in addressing the challenges and opportunities of Precision Medicine and the ONC's requirement for meaningful use of patient data. The main challenge to the Division is now the development of a sustainable business model beyond the initial 5 year foundation period. Early indications, from UAB's AMC21 strategic plan to specific initiatives towards Precision Medicine by UAB's Comprehensive Cancer Center, suggest that the alignment with the clinical workflow is a major component of both financial sustainability and continued academic development of the Division of Informatics.

¹ Big Data to Knowledge, see bd2k.nih.gov

² Am. Board of Pathology starts certification in the subspecialty of clinical informatics Oct 2013.

LABORATORY MEDICINE



Clinical Service: The UAB Division of Laboratory Medicine, working together with UAB Medicine/Health System Administration (matrix management), provides oversight of all laboratory operations and accreditation, as well as clinical consultation, laboratory test selection, test utilization and quality improvement for UAB Hospital, The Kirklin Clinic, the Birmingham VA Hospital, UAB Highlands Hospital and Prime Care Clinics. The Laboratory Medicine Division includes 12 faculty members: four with M.D., Ph.D.s; four with M.D.s; and four with Ph.D.s. with diverse skill set and operational

expertise. Faculty are noted for multidisciplinary academic productivity, grant support and leadership positions at several national and international organizations and professional societies. There are extensive teaching commitments within the School of Medicine and Pathology Residency/Fellowship/Graduate Programs. The faculty in the Division have a broad spectrum of interests and expertise in clinical diagnosis and management; including Clinical Chemistry, Flow Cytometry, Hematology/Hematopathology, Hemostasis, Immunology, Microbiology, Molecular Diagnosis and Transfusion Medicine. Total test volumes of the combined laboratories > 5.44 million/year (2012) and laboratory/health system charges ~ \$ 500 million/year.

Teaching: The Division is actively involved in teaching medical students, MD/PhD student, graduate students (GBS), and clinical residents/fellows. Several faculty members have received single or multiple School of Medicine “Teacher of Year” awards. One of the faculty members serves as Assistant Dean for Physician-Scientist Education and as Director of the MSTP program. The Division has ACGME accredited fellowships in Blood Banking/Transfusion Medicine, as well as Hematopathology and Molecular Pathology (the latter two with the AP Division).

Research and Impact at National Level: External grant support awarded to Division faculty in 2012 is approximately \$2.3 M (NIH/other). The Division is also represented as senior, associate editors or as editorial board members of, but not limited to: Journal of Clinical Microbiology, American Journal of Clinical Pathology, American Journal of Pathology, Current Protocols in Molecular Biology, Proteins: Structure, Laboratory Medicine, Journal of Clinical Apheresis, J Immunology etc., (total 24 journals).

The Laboratory Medicine Division is well represented in leadership positions of national organizations, including the President of ACLPS (Lorenz), President-elect of Apheresis Society (Marques), Chair for Pneumococcal antibody NIH/FDA standardization (Nahm) and member of NCCN CML committee (Reddy).

Laboratory Medicine performance in the past several years is congruent with strategic priorities of the School of Medicine, AMC21 and UAB Medicine/Health System.

Of concern are preponderance of faculty at senior rank, Lab Medicine increasingly a PhD field, decreasing research funding/faculty participation, aging laboratory physical infrastructure (e.g. HVAC system), lack of laboratory automation and barcoding capability with the Hospital Information System. Molecular Pathology volumes and test menu are below the expected level of peers (e.g. Emory, Vanderbilt etc.). Additional concern is the payor mix and reimbursement process.

Opportunities are in the outreach operation and expansion of consult service based on faculty expertise and unique geographic location of UAB Medicine.

MOLECULAR & CELLULAR PATHOLOGY



Research: The Division of Molecular and Cellular Pathology (MCP) was established in 1991 to strengthen the basic research and educational missions of the Department of Pathology. The Division currently comprises 23 full-time faculty members, at all ranks, who are focused on basic research into the molecular mechanisms that underlie the development of disease. Current areas of research in the Division include cardiovascular disease, cancer, bone biology, liver disease, diabetes and insulin resistance, matrix biology, HIV and free radical biology. Division investigators have a funding portfolio approximately \$10 million dollars in extramurally funded

research grants, which has remained relatively stable over the past 4-5 years despite the decline in NIH funding. Division faculty play leading roles in the UAB Centers for Metabolic Bone Disease, Free Radical Biology, BioMatrix Engineering and Regenerative Medicine, the Comprehensive Cancer Center and the Comprehensive Cardiovascular Research Center. Importantly the research interests of MCP faculty are closely aligned with many of the thematic priority areas of the AMC21 strategic plan, including Cancer, Diabetes, obesity and metabolism, Neurosciences, Infectious diseases and global health and Cardiovascular biology. Members of MCP also directly contributed to the AMC21 strategic planning process either as Co-Directors, Steering Committee members or working group members.

Teaching: MCP faculty have made significant contributions to graduate education at UAB. Prior to the current theme based GBS program, the Department of Pathology had one of the largest graduate programs in Pathology in the US and faculty played a major role in teaching and mentoring students in this program. During the transition and establishment of the theme based graduate program, MCP faculty have continued to take a leadership role in graduate student teaching, particularly in the Pathobiology and Molecular Medicine and Cancer Biology themes. The Division also received one of 13 nationally awarded grants to establish the UAB Howard Hughes Med-Grad Fellowship Program, a University-wide translational Ph.D. program. Moreover, MCP faculty have received recognition, both at UAB and nationally, for their contributions to mentorship and teaching.

Service: Almost half of the MCP faculty participate regularly in NIH peer review; the division is also well represented in peer review panels for the *Department of Defense*, the *American Heart Association*, the *Veterans Administration* as well as numerous other national and international foundations. MCP faculty are also either Associate Editors or on the Editorial Board of at least 30 different journals, including the *Journal of Biological Chemistry*, the *American Journal of Physiology*, the *American Journal of Pathology* and the *Biochemical Journal*. In addition the Division is well represented in the leadership of a number of professional organizations such as *The American Physiology Society*, *The Shock Society*, the *Society for Free Radical Biology in Medicine*, and the *American Society for Matrix Biology*.

In summary, the members of the Division of Molecular and Cellular Pathology not only contribute substantially to the overall research and educational mission of the Department of Pathology, but are also widely involved in service activities in national and international scientific and professional organizations. One of the challenges faced by the Division is that the faculty are distributed across four buildings; additionally with the implementation of the GBS theme based graduate programs, activities surrounding the Department of Pathology graduate program have inevitably diminished, which further decrease opportunities for interactions between division faculty. We have started to address this by holding a Divisional Research Retreat in August 2012 and a second retreat will take place in September 2013. To ensure greater success of junior faculty we have also implemented a mandatory faculty mentoring committee for all non-tenured faculty. Given the rapidly changing landscape of graduate education we are pursuing funding opportunities to support novel approaches to graduate teaching and will continue to maintain a leadership role for MCP faculty in graduate education at UAB. We are also working closely with the Vice Chair for Research to strengthen collaborations between divisions, expand research interests aligned with NIH strategic goal such as drug discovery and translational research and increase multi-PI, program and center grants.

NEUROPATHOLOGY



The UAB Division of Neuropathology is one of the largest and most successful Neuropathology Divisions in the country. The Division, which is directed by Steven Carroll, M.D., Ph.D., includes 4 M.D.s [Drs. Richard Powers (Professor), Ken Fallon (Associate Professor) and Rob Hackney (Assistant Professor)] and one Ph.D. [John Shacka (Assistant Professor)]; in addition, Dr. Kevin Roth, the Chair of the Department of Pathology, is a former Director of the Division and a trained neuropathologist who still consults on difficult cases with Division members. The

Division provides primary neuropathology surgical and autopsy diagnostic service to University Hospital, the Birmingham Veteran's Hospital and UAB Highlands. We also provide consultations to Children's Hospital and the Jefferson County Coroner/ Medical Examiner Office and are in negotiations to provide consultations to the Alabama Department of Forensic Sciences. We examine approximately 800 neurosurgical specimens annually, the majority of which are tumors, and approximately 200 autopsy brains. Due to the growing volume of UAB surgeries and outside consults, we have seen a steady increase in our surgical case volume over the last 5 years (e.g., charges and collections for FY12 were 124% and 126%, respectively, of charges and collections for FY11).

Research in the Division of Neuropathology is diverse and includes studies of the genomic and signaling abnormalities involved in the pathogenesis of neoplasms associated with neurofibromatosis type 1; the molecular regulation of apoptotic and autophagic cell death during development, in neurodegenerative diseases and neoplasia; the pathology of epilepsy, neuropsychiatric and neurodegenerative conditions; the environmental and genetic triggers for Lewy body formation; and mechanisms of neuronal death in Parkinson's disease and other neurodegenerative conditions. The Division's research portfolio is supported by multiple funding sources including the National Institutes of Health, the Department of Defense, the VA and the Children's Tumor Foundation. The Division also houses resources that more broadly support research in both the Department of Pathology and in other UAB departments including the Brain Resource Program (which provides human nervous system specimens to investigators) and the Neuropathology Service Center (which provides access to two MBF stereology/morphometry systems and an Arcturus Veritas laser microdissection system).

The Division of Neuropathology teaches undergraduate medical students, residents and fellows and graduate students. We have a long history of teaching excellence in these areas as demonstrated by the fact that Drs. Powers, Carroll and Roth have each received multiple medical school "Lecturer of the Year" awards here at UAB and at Washington University in St. Louis. Further, the Neuropathology section of the second year medical school course was voted by the Argus Society as "Best Correlative Pathology Section" for over 10 straight years.

There are some weaknesses within the Division that, if corrected, offer significant opportunities for future development. The Division faculty lacks strength in some key areas including neurodegenerative disease research and research on CNS neoplasms. Recruitment in the latter area is particularly essential, given the growing interest at UAB in cancer genomics and informatics and the success this institution has had with the Brain SPORE. To take advantage of this opportunity, the Division will need to recruit in these key areas and obtain additional resources (e.g., access to essential common equipment).

IV. RESEARCH

IV. RESEARCH IN THE DEPARTMENT OF PATHOLOGY



The research mission has shaped the character and ethos of the department since the mid 1990's and is now a signature program complementing excellence in both the research and teaching missions in all divisions. The leadership of the Department has strategically utilized this robust research base to promote our training and clinical missions and is constantly in search of new initiatives to build on these successes. In 2009, the Chair recognized the potential impact of integrating research programs across the Department and appointed Dr. Darley-Usmar to the position of Vice Chair for Research with responsibility for strategic planning of research. Of the 74 full time faculty, 45 have extramural funding, which in total is approximately \$20 million, from a diverse array of funding sources including NIH, DOD, Industry and private foundations. Not surprisingly, and as detailed in the divisional reports, this intense activity in the research arena results in a clear and sustained record of academic excellence including the publication, from pathology faculty, of over 900 scholarly articles since 2008.

The Research Network in the Department of Pathology: The leadership of the department represented by the Executive Council fully embraces the value of collaborative research both within the Department and across the institution. As an objective assessment of whether these values are shared and engaged by the faculty a networking survey was performed to determine the level of interaction and the benchmarks for success (funded grants, joint publications, impact on UAB research activities). The key findings were:

- The Pathology Department is highly interactive with over 519 collaborations involving 95% of the faculty.
- Over 140 joint publications and 110 research grants have arisen from these collaborations.
- Intra-departmental research collaborations are strongly influenced by the divisional structure.
- Institution-wide interactions are not strongly influenced by divisional structure.
- Informatics is a potential clinical-basic research bridging discipline.
- Department faculty have been recipients of major planning internal grants from the School for future multi-investigator applications.

This collegial and interactive environment is important to value and build on as we move forward to maintain funding levels, increase the engagement and participation in research of the entire faculty and take advantage of all available funding opportunities.

Impact of Pathology Faculty on Research at UAB: The Department plays an integral part in the research infrastructure in the institution which is organized through the University Wide Interdisciplinary Centers. These 25 Centers are designed to catalyze research in defined disciplines across all schools and are the primary mechanism for the organization of Research Cores, Pilot Projects and Center Grants at UAB. The senior faculty play a major leadership role in 5 of these centers and approximately 90% of all the faculty are members of one or more centers. Since the Centers also play a critical role for the strategic planning in research in the school, Pathology faculty are in a strong position to influence the overall research programs across campus.

Strategic Research Acceleration Programs: In 2008, the decision to establish a new Informatics Division in the Department of Pathology (established 2011) recognized the key role this discipline would have on both the training and research missions of Pathology in the next ten years. From the research network analysis it is clear that this strategic decision is already bearing fruit and impacting the training of the clinical residents and fellows

as well as the research programs. In a separate initiative to build upon the Department's strength in mitochondrial biology and its translational potential the UAB Mitochondrial Medicine Laboratory was formed in 2011. This program is now engaged in translational studies to determine how determining cellular bioenergetics can aid the management and treatment of patients at UAB.

Research Administration, Support and Management: The mission to promote research and its support through extramural funding is shared among the Division Directors, Vice Chair of Research and the departmental administrative team. The Vice-Chair works with the Division Directors and Chair to manage research across the Department. A major goal for the Research Administration is to support all faculty engaged in research through the use of transparent and efficient administrative procedures for grants submission, management and mission support. All faculty have experienced administrative support for the preparation of intramural and extramural research proposals which involves preparation and validation of the budgets, biosketches and related information. The preparation of complex submissions such as P30, PPG or T32 proposals is managed through forming administrative support teams specific for each proposal. This has been highly successful with the submission of multiple proposals for each deadline with few if any administrative errors.

Recognition of Excellence in Research. In the maturation of the Department in research over the last ten years many of the senior faculty have achieved prominence in their fields and have enhanced the reputation of both the Department and UAB. To recognize these achievements we have established 6 new Endowed Professorships/Chairs in Cancer Biology, Mitochondrial Medicine, Bone Biology, and Gynecological Cancer. The Department is also showcased in our Endowed Pritchett Lectureship each year in which we invite prominent scientists who have made a major contribution to research pathology and has included 4 Nobel Laureates. We also recognize outstanding performance at the trainee level with prizes for outstanding research presentations at the trainee research day.



Extramural Funding: Since the early 1990's when a strategic commitment to enhance research was made, Pathology funding grew from approximately \$1-2 million in 1992 (NIH ranking **48**) to a peak of \$23-27 million between 2006-2010 and a current level of approximately \$20 million in 2013 (NIH ranking 2012-16). The pressure on all funding sources is clearly a concern for the faculty at a personal level and to the leadership from a departmental perspective. We are addressing this at several levels.

To promote proposal submissions and appropriate fiscal management of grants:

- Providing administrative support for grant submission and management to allow faculty to focus on the science of proposal preparation.
- Providing an annual professional development fund to faculty (\$2,500-\$4,000).
- Providing financial support for laboratory services not covered by grants.
- Providing financial support for trainee tuition, stipend supplements and insurance when discretionary funds are not available to faculty.
- Establishing policies for faculty salary coverage.
- Management of research space.

Integration of Research with Training and Mentoring. The representation of our trainees at national and international meetings is an important element in enhancing the Departments reputation in research. To facilitate this, an annual travel award from the Chairs office and the Adams grants, are available for trainees performing their research with Department of Pathology faculty for use towards presenting their data at National/ International meetings. This financial commitment has been critical in providing our trainees opportunities to present their work in diverse scientific forums. Helping promising Post-Doctoral trainees transition to independence is an important part of our mission and some of our most productive and promising faculty have been promoted through this route. The first few years as a faculty member are critical and provide appropriate career development and guidance. Mentoring of all junior faculty is required until the point they reach tenure. This is a formalized process managed by the divisions and involving mentoring committees.

V. EDUCATION

V. EDUCATION AND TRAINING MISSION

The Department of Pathology has earned a national reputation for its training and mentoring programs with the award of training grants and multiples awards to the faculty for teaching and mentoring. Over the past 5 years both the Medical School and Ph.D./MSTP training programs have undergone substantial evolution in the School of Medicine. The Department of Pathology has successfully navigated these changes with our Faculty retaining key leadership positions and maintaining a strongly supportive environment for trainees at all levels from undergraduate trainee programs, through graduate students, Post Doctoral fellows and Clinical Residents and Fellows. The Faculty play major leadership roles in the MSTP Training Program (Dr. Robin Lorenz: Director), the feeder programs for Ph.D students (Dr. Rakesh Patel, Co-Director) and the HHMI training program (Dr. Rakesh Patel, Director). A current focus is to promote greater interaction between the basic science and clinical trainees.

Basic Science Graduate Education: evolution from a

departmental to school based Ph.D. program. The Molecular and Cellular Pathology graduate program is amongst the most successful at UAB and Pathology departments nationwide. The size of the program steadily rose from eight students enrolled in the program in 1990 to 63 students in 2009 with an average of 8-10 students graduating per year over the last 5 years.

Currently, we have 22 students in the program reflecting the transition from departmental graduate programs to theme based programs within the SOM. Excellence in Ph.D. training by Pathology faculty has been recognized by our peers indicated by our students receiving numerous awards (including the Barker award for most outstanding Ph.D. student at UAB in 2007), training grants and prestigious fellowships and they are frequently recognized for their scholarly and research achievement evidenced by receipt of numerous awards from national and international meetings.



In 2010, the Graduate Biomedical Sciences (GBS) program was established at UAB to replace departmental programs, and represents the evolution of a unique predoctoral training program that spans 8 thematic areas of research. The GBS is the common portal for graduate studies in the Biomedical sciences, and is composed of over 400 graduate students, across 8 interdisciplinary themes. Department of Pathology faculty comprise ~10% of GBS approved faculty and are represented in all 8 themes Biochemistry & Structural Biology (4 faculty), Cancer Biology (19 faculty), Cell–Molecular and Developmental Biology (16 faculty), Genetics and Genomic Sciences (5 faculty), Immunology (7 faculty), Microbiology (5 faculty), Neuroscience (3 faculty), Pathobiology & Molecular Medicine (28 faculty). Moreover, Pathology faculty have taken prominent leadership roles during and since this transition including Theme Directors or co-directors, members of Steering and Oversight committees for GBS, Curriculum Committees, Faculty Review Committees, Directors for GBS core curricula and theme specific courses, and roles in AMC21 SOM strategic planning committees focused on the UAB biomedical training environment. To underscore our ongoing commitment and significant role in graduate education in biomedical sciences, between 2009 and 2012, 15% of enrolled students in GBS joined primary Department of Pathology faculty to perform their dissertation research. Considering our department provides only 10% of faculty in GBS, this indicates that we continue to provide an outstanding training program for biomedical graduates at UAB. An important metric is that >98% of polled graduates since 1992 have developed science based careers in the academic, industrial or government sector.

Finally, the Department of Pathology has played the lead role in UAB acquiring and directing 3 T32 grants and the prestigious HHMI funded “Med into Grad” program. In 2006, UAB Pathology received funds from the HHMI for an innovative fellowship program that focuses graduate training on translational research. At that time, only 13 were awarded nationwide. Since all 22 HHMI funded “Med-into-grad” training grants will be terminated in 2014 a T32 has been submitted to replace this program.

Post-Doctoral Training: The faculty in the Department have trained over 60 Post-Doctoral scholars over the last 5 years and have received over 26 awards or recognition from national meetings or as Young Investigator Awards. UAB is fortunate to have a highly proficient Post-Doctoral Office which is administered by the graduate school and provides extensive career training for Post Docs on a wide range of topics. The Department of Pathology supports Post-Doctoral training by providing support for travel to meetings and engaging them in Departmental Research in the Trainee Research Day. In addition, we have developed a very successful program for developing our most promising Post Doctoral Fellows as junior faculty which is described in more detail in the research section.

Undergraduate Education and Research Experience: The Department has supported several programs to allow undergraduates to have their first encounter with research and are also frequently used to enhance opportunities for underrepresented minorities. For example, the Summer in Biomedical Science (SIBS) Undergraduate Research Program was started in 2004 and is based in the Department of Pathology and directed by a Pathology faculty member. The goal is to introduce undergraduate students from backgrounds underrepresented in physician-scientist training programs and/or who have no local campus access to biomedical research experiences to basic science research on models of human disease, the principles of scientific experimentation, and the role of physician-scientists in an academic medical center. This program has been very successful with 52/60 (87%) of the students who have completed the SIBS Program and graduated from college with (9 students) in residency, (17 students) in medical school, (17 students) graduate in graduate school, and 5 students studying for M.D./Ph.D.



Medical Education: The UAB School of Medicine has an integrated medical curriculum without specific department run courses. Instead, the pre-clerkship curriculum comprises 11 Modules starting with Fundamentals Modules I and II and then progressing to 9 systems based Modules. Each Module has a Director and a Clinical Co-director and 6 of these leadership positions are held by pathology faculty. Contact hours (approximately 250/year) for Pathology teaching faculty has remained fairly stable over the past few years since inception of this new curriculum in the 2007/2008 academic year. In that

first year we taught two curricula simultaneously, thus doubling the number of contact hours. Pathology is well prepared for the case-based small group instructional activities since we have always been strong in this area. The UAB School of Medicine maintains a robust student evaluation system for all undergraduate medical education teaching activities and this is linked to the student nominated prestigious Argus Awards. Pathology Teaching Faculty and Pathology Faculty led modules have routinely received multiple Argus Awards.

Exposure of Medical Students to the research environment is also a critical component of our mission. To achieve this the Medical Student Summer Research Program (MSSRP), which is an NIH funded T35 program based in the Department of Pathology introduces medical students to the concepts of bench and clinical research, the principles of scientific experimentation, and the proper methods of data analysis both in the laboratory and in the

literature. While publications are not the prime objective, many (31%) of the summer interns who participated in the program from 1985-2011 have been co-authors on articles or abstracts involving their MSSRP research. This is impressive, given that the students had only one summer in the laboratory, and many of them have never worked in a modern research laboratory before.

The Next Generation of Clinician Researchers-Pathology and the M.D./Ph.D. Program. The Medical Scientist Training Program (MSTP), based in the department and directed by Dr. Robin Lorenz, trains outstanding young people in the intellectual discipline of being a scientific investigator and a thoroughly trained physician. This is now one of the most sought after programs in the country with 277 applications in 2013 (for 8 slots) with an average of over 5 publications per trainee. This program aims to (1) offer superb classroom training in both basic science education and the fundamentals of clinical education; (2) train students in the tools necessary to become successful biomedical scientists, including grant and manuscript writing, as well as time and laboratory management; and (3) graduate physician-scientists who go on to become leaders in academic medical centers throughout the country.

Training the Next Generation of Clinicians; Clinical Residency and Fellowship Programs: In the arena of graduate medical education, the Department offers individually tailored training programs in straight or combined anatomic and clinical pathology toward Board qualification in each area. Our ACGME approved residency program in Pathology is approved for 32 positions in general Pathology. Funding has restricted us to 6 per year over the last 5 years. In that period of time, we have also had the addition of research funds through the Robert Adams Foundation. In summary, while conducting the 48 months of rotations in Pathology for AP/CP certification our rolling 3 year average of articles, abstracts and presentations by our 26 residents has averaged over 50.

Training in all areas focuses on the understanding of disease at the macroscopic, microscopic and molecular levels. Additional training opportunities include specialty fellowships, clinical research fellowships or other approved training and are designed to meet the needs of the individual. The educational experience of training is coordinated through the Department's divisions of Anatomic Pathology, Laboratory Medicine, Neuropathology, Informatics, Forensic Pathology and Molecular and Cellular Pathology. In-depth experience with each rotation is provided. These rotations are integrated with



an active in-call system and conferences with a variety of clinical subspecialties. Training in laboratory medicine after the initial year is tailored to the individual's career goals with emphasis on understanding disease at the molecular level and subspecialization. Appointments for one to three years of research in experimental pathology are available to all house officers and a combined residency/PhD is available for exceptional individuals.

In addition, ACGME accredited training fellowships are offered in Transfusion Medicine, Dermatopathology, Neuropathology, Cytopathology, Hematopathology, Molecular Genetics and Forensic Medicine. One-year fellowship positions in Surgical Pathology and organ-specific pathology (e.g. Renal Pathology, Bone and Soft Tissue Pathology and Gastrointestinal Pathology) as well as Transplantation Pathology are available for persons who have completed a majority of their residency program in Anatomic Pathology.

Our five year average of residents who completed the program is in excess of 98% being board certified with some not yet scheduled to take the boards. We have had considerable success in our trainees obtaining

fellowships not only at UAB but at some of the following institutions Stanford, Michigan, Harvard-Brigham Service, Harvard-MGH Service, Washington University, Duke University, UNC, MD Anderson and the Mayo Clinic.

Graduate and Trainee Education: The future. Over the last 5 years we have implemented new programs with our goals being to i) continue and foster a strong sense of community amongst all our trainees (student, fellow and resident) and faculty in our Department, ii) support faculty who are engaged in training. The Pathology Trainee Research day is a one day annual event organized under the stewardship of the Pathology Graduate Program Director, but primarily by collaborations between our departmental students, postdoctoral trainees and residents and involves selection of alumni speaker, abstract reviews, oral and poster presentation selections. This platform also serves the research mission as it provides a key vehicle for trainees and faculty from all areas within Pathology to interface, learn about the diverse areas of research and clinical care and provide unique opportunities to integrate and the high quality of training and research that occurs within our Department. We are taking advantage of the new Informatics division in our Department by providing basic training in the fundamentals of Bioinformatics and practical workshops for the residents and fellows. Recent innovations include the development of a certificate program in Translational and Molecular Sciences at UAB and development of new teaching approaches. We will continue ways to enhance and integrate the teaching and training mission in the department.

VI. CLINICAL CARE

VI. CLINICAL CARE

INTRODUCTION:

The UAB Department of Pathology offers comprehensive diagnostic laboratory services to UAB Hospital, UAB-Highlands Hospital, The Kirklin Clinic, Callahan Eye Foundation, Birmingham Veterans Administration Medical Center, and multiple satellite clinics. Approximately 6 million tests are overseen by the Medical Directors and Hospital Laboratory staff. In addition, a limited amount of Outreach service is provided for physicians' offices and clinics.

UAB Health System has over 1,000 active staff physicians and a similar number of accredited residents in almost 100 separate training programs. Clinical service is provided 24 hours a day, seven days a week by the Department of Pathology. Pathology service is provided through a matrix management system which integrates the Department of Pathology clinical faculty with approximately 365 UAB Hospital Laboratory employees. The matrix management system has been quite successful in defining and maximizing the roles of both physicians and technicians in support of patient care. The diagrams below define the matrix management reporting structure at our various practice sites.

In each Division, a Section Head and Supervisor report up the line to a Division Director and Administrator for Hospital Laboratories, respectively; they then report in parallel to the Chair of the Department and Associate Vice President (AVP) for Hospital Laboratories. The processes executed through this system include the integration of patient data; purchase of capital equipment; addition/deletion of tests in the on-site menu; selection of reference tests for our patients; qualifications and competencies of the staff, including technologists and technicians and quality of the product of Hospital and Anatomic Pathology Laboratories. This includes satisfying the regulatory requirements of the UAB Health System, primarily through the bi-annual College of American Pathology Laboratory Accreditation Program (through which UAB achieves Deemed Status for JCAHO), and the additional regulatory agencies of the American Association of Blood Banks and the FDA for Blood Bank, Microbiology, Immunology, and Chemistry.

The Department of Pathology is currently housed in excellent facilities largely due to the close cooperation between the School of Medicine and the UAB Health System. The new facility improvement project included the development of new space in the Hospital Services Building for the Cytopathology section and the new Anatomic Pathology facility. This has allowed the Department to have complete and comprehensive state-of-the-art facilities in all areas of Anatomic Pathology, Clinical Pathology and Neuropathology. The autopsy space in the Hospital Services Building and the modern surgical pathology space in the North Pavilion, which opened in 2004, were part of a major hospital facility improvement. The contiguous Women's and Infants Hospital was completed in 2012, and the Department of Pathology provides service for that facility as well.

CLINICAL LOCATIONS AND ACTIVITIES:

	Activity	Pathology
UAB Hospital & UAB Hospital – Highlands	Inpatient (1,157 beds)	Comprehensive Anatomic Pathology, Laboratory Medicine & Neuropathology Clinical Services
The Kirklin Clinic	Outpatient >400,000 visits/yr	Satellite of Hospital Pathology
Birmingham Veterans Administration Hospital	Contiguous Inpatient Facility (313 beds)	Comprehensive AP, LM & NP Services
Health System Satellite Outpatient Locations (7)	Kirklin Clinic at Acton Road Family Practice 20 th Street McDonald Clinic Hoover Clinic Inverness Clinic Moody Clinic	Laboratory Medicine Oversight
Callahan Eye Foundation Hospital	106 Beds, 23,000 patients per year, 10,000 surgeries per year, 36 active surgeons	

COLLABORATIVE SERVICES:

The following services are interdisciplinary and multi-disciplinary programs.

➤ **Coagulation/Hemostasis Service** (Medicine/Pathology)

The UAB coagulation service is dedicated to meeting the coagulation medicine needs of Northern Alabama. The service faculty unify collective knowledge of Pathology, Internal Medicine, Hematology and Laboratory Sciences to advise on the diagnosis and management of both hemorrhagic and thrombotic disorders. Experienced senior technologists staff the coagulation laboratory and are available to advise on all technical issues. Application of electronic database technology enables the service to provide consistent, valid and cost-effective laboratory and consultative coagulation resources.

➤ **Dermatopathology Service** (Dermatology/Pathology)

This service provides Dermatopathology through joint efforts between the Department of Dermatology and the Department of Pathology. Currently, our faculty Dermatopathologists are Dr. Kristopher McKay and Dr. Kathleen Beckum, both of whom are board certified dermatopathologists. Numerous services are offered including H&E stains, special immunohistochemical markers, immunofluorescence and cytology.

➤ **Osteoporosis Program** (Nutrition/Medicine/Pathology)

Osteoporosis Program and Clinic provide a thorough evaluation of referred patients, including an assessment of bone mineral density, nutritional counseling, treatment and rehabilitation. Faculty in Pathology and the Center for Metabolic Bone Disease provide program support in bone analysis and research.

- **Cytology/Fine Needle** (Surgery/Radiology/Pathology)
Fine Needle Aspiration Biopsy (FNA) is an accurate, rapid, non-invasive, cost-effective technique for the diagnosis of neoplastic, non-neoplastic and infectious processes. FNA may be performed by Cytopathologists for neck, thyroid, breast, palpable lymph nodes and other superficial lesions. The FNA service also supports endoscopic, radiologic and mammagraphically guided FNA with rapid evaluation for adequacy, resulting in more efficient patient care. Over the last decade UAB Cytopathology has become well known for advancing the field of EUS-FNA especially as related to the diagnosis of Hepatobiliary Tract -Pancreas neoplastic processes.

- **Bone Marrow Service** (Medicine/Pathology)
The Bone Marrow Biopsy/Consultation Service is a collaborative effort between the Departments of Pathology and Medicine/Hematology Services and provides comprehensive state wide regional diagnostic service utilizing traditional morphology, special cytochemical stains, immunophenotypic data and FISH. Experienced medical technologists handle the biopsy material at the patient's bedside, triaging specimens for various ancillary tests and routine stains.

- **Cytopenia** (Pharmacy/Pathology)
The Immunocytopenia Laboratory performs assays to determine the immunologic basis of cytopenias, including heparin-induced thrombocytopenia. Laboratory staff and director maintain a close relationship with clinicians and prompt consultation is always available to determine the most appropriate use and/or interpretation of the tests being offered. Recently, the service started a collaborative effort to improve the understanding and management of heparin-induced thrombocytopenia with the Pharmacy Department.

- **Autopsy** (Jefferson County/Pathology)
Through a contract with Jefferson County, the UAB Forensic Faculty provide pathology medical services for the Jefferson County Coroner/Medical Examiner Office in space located in the Cooper Green Hospital. Faculty in the division perform complete autopsies and detailed external examinations for deaths within the county. They provide formal scientific presentations in trials, depositions and/or preliminary hearings.

- **Fungal Reference Laboratory** (Medicine/Dermatology/Pathology)
Under the direction of Stephen A. Moser, Ph.D. (Pathology), the UAB Fungal Reference Laboratory is a joint effort of the Departments of Pathology, Medicine (Peter G. Pappas, M.D.) and Dermatology (Boni E. Elewski, M.D.). The laboratory employs three technologists and activities include performing antifungal susceptibility testing, aspergillus galactomannan testing and culture and microscopy for fungi on clinical specimens on a fee-for-service basis. The laboratory participates in a variety of research activities including in vitro evaluation of new antifungal agents, real-time PCR for the detection of invasive fungal infections and molecular typing of fungi and bacteria.

PATHOLOGY CLINICAL FACULTY BY SUBSPECIALTY

Subspecialty	Participating Faculty		
Autopsy	Bruce Alexander Silvio Litovsky James Hackney	Ona Faye-Petersen Stephanie Reilly	Andra Frost Kenneth Fallon
Cardiovascular Pathology	Silvio Litovsky	Thomas Winokur	Lea Novak
Cytopathology	Isam-Eldin Eltoum Andra Frost	Ralph Crowe	Huma Fatima
GI/Liver Pathology	Thomas Winokur	Leona Council	Ralph Crowe
GU Pathology	Isam-Eldin Eltoum	Shi Wei	Dejun Shen
GYN Pathology	Michael Conner	Lea Novak	
Surgical Pathology	Bruce Alexander Samuel Borak Deniz Peker Vishnu Reddy Thomas Winokur Margaret Brandwein-Gensler	Walter Bell Ralph Crowe Leona Council Shuko Harada Dejun Shen	Michael Conner Isam-Eldin Eltoum Lea Novak Gene Siegal Shi Wei
Breast Pathology	Andra Frost Shi Wei	Dejun Shen	Shuko Harada
ENT Pathology	Walter Bell	Margaret Brandwein-Gensler	
Embryo-Fetal Pathology	Ona Faye-Petersen	Stephanie Reilly	
Endocrine Pathology	Ralph Crowe	William Grizzle	
Hematopathology	Vishnu Reddy	Deniz Peker	Samuel Borak
Orthopedic Pathology	Gene Siegal	Shi Wei	
Dermatopathology	Kristopher McKay	Kathleen Beckum	
Oral Pathology	Walter Bell	Margaret Brandwein-Gensler	
Nephropathology	William Cook	Casey Weaver	Huma Fatima
Pulmonary Pathology	Bruce Alexander	Ralph Crowe	
Tumor Markers	Gene Siegal		
Electron Microscopy	William Cook	Casey Weaver	Huma Fatima
Flow Cytometry	Pat Bucy	Vishnu Reddy	Deniz Peker
Immunohistochemistry	Thomas Winokur Isam-Eldin Eltoum	Gene Siegal	Shi Wei
Immunofluorescence Microscopy	William Cook Margaret Brandwein-Gensler	Casey Weaver	Huma Fatima
Molecular Diagnostics	Gene Siegal Vishnu Reddy	William Benjamin Seung Park	Shuko Harda Thomas Winokur
Bone Marrow	Vishnu Reddy	Samuel Borak	Deniz Peker
Clinical Immunology	Moon Nahm	William Benjamin	Robin Lorenz
Clinical Microbiology	William Benjamin	Stephen Moser	
Transfusion Medicine	Marisa Marques	Jill Adamski	Lance Williams
Clinical Chemistry	Robert Hardy	John Smith	Andrew Robinson
Hematology	Vishnu Reddy		
Hemostasis	Marisa Marques	Vishnu Reddy	Jill Adamski
Toxicology	Andrew Robinson		
Forensic Pathology	Robert Brissie	Gregory Davis	Gary Simmons
Neuropathology	Steve Carroll Kevin Roth	James Hackney	Kenneth Fallon

UAB HOSPITAL LABORATORIES:

UAB Hospital Laboratories perform testing for the UAB Medicine enterprise, which includes UAB Hospital, UAB Highlands, the Kirklin Clinic, Health Services Foundation Clinics, and the Callahan Eye Foundation Hospital. The Hospital Laboratories Department encompasses core laboratories within UAB Hospital, remote satellite laboratories, the Office of Bedside Testing, the Laboratory Medicine Division, Autopsies and Decedent Affairs, and the Anatomic Pathology Division. The operation provides laboratory services for patients seen in both the outpatient and inpatient settings of care across UAB Medicine.

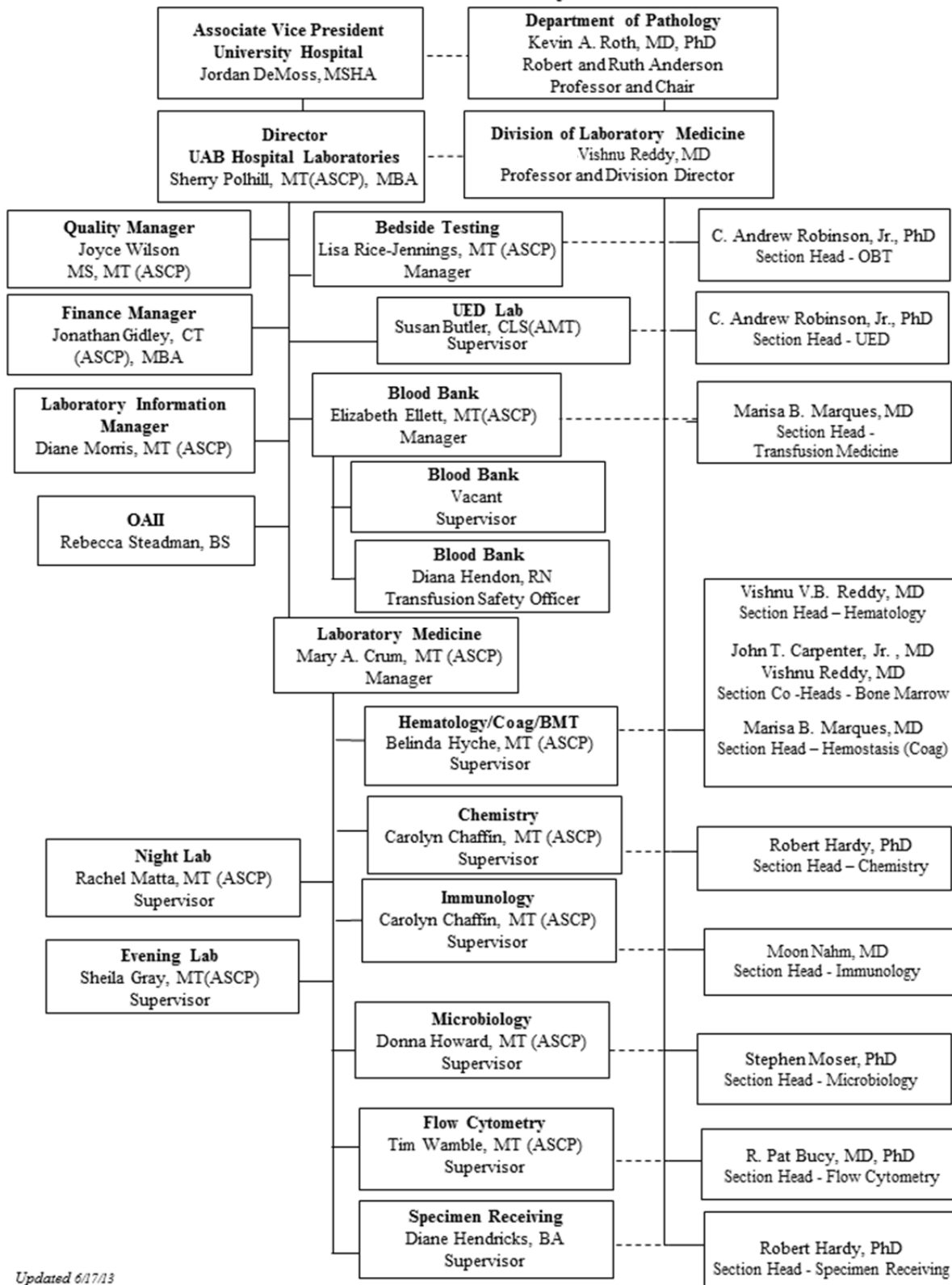
There are 365 total laboratory employees that provide laboratory services in partnership with faculty members from the Department of Pathology who provide the clinical expertise of accreditation, procedures, quality and methodologies of testing performed in the Laboratory Divisions.

The table below summarizes the volume of testing and associated Gross Revenue in FY12 compared with the projected statistics for FY13. The table exhibits continued year-over-year growth within the department.

Hospital Labs	FY12 Volumes	FY12 Gross Revenue	FY13 Actual Volumes	FY13 Actual Gross Revenue
Lab Medicine Division includes: Satellite Labs, Outreach, Office of Bedside Testing, UED Lab, Highlands Lab, Blood Bank Lab & the Callahan Eye Foundation Hospital	5,442,616	496,678,239	5,679,067	601,538,666
Anatomic Pathology Division includes Autopsies, Histology, Special Procedures, Transcription, and Cytology areas	146,195	31,382,541	160,145	33,939,056
Totals	5,588,811	528,060,780	5,839,212	635,477,721

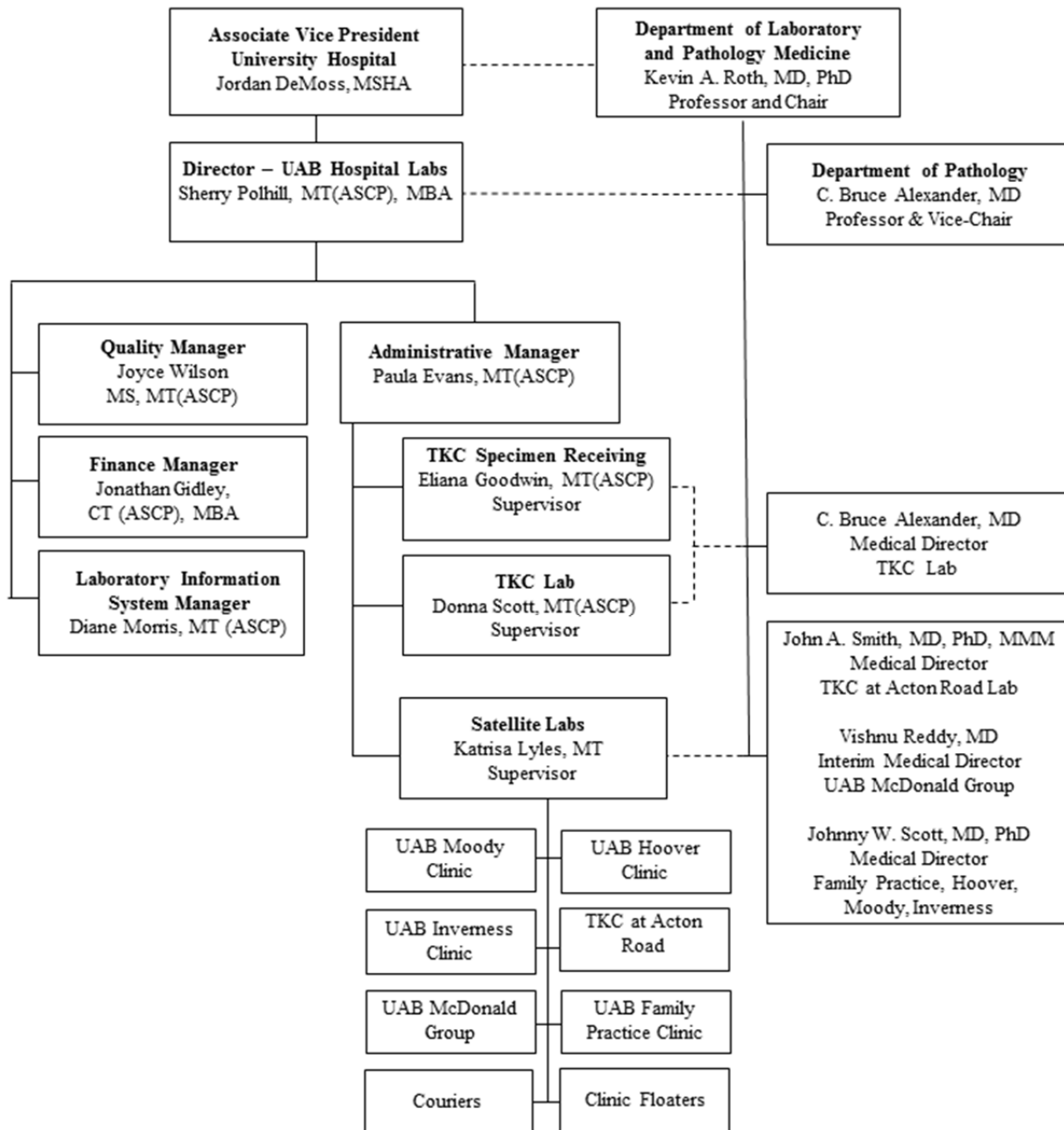
UAB Hospital Laboratories are CAP accredited, along with inspections requested from the FDA, JCAH, and CLIA when requested. The Hospital Laboratories, UAB Medicine Administration, and the Department of Pathology work collaboratively to offer quality testing.

University of Alabama Hospital Laboratories Division of Laboratory Medicine



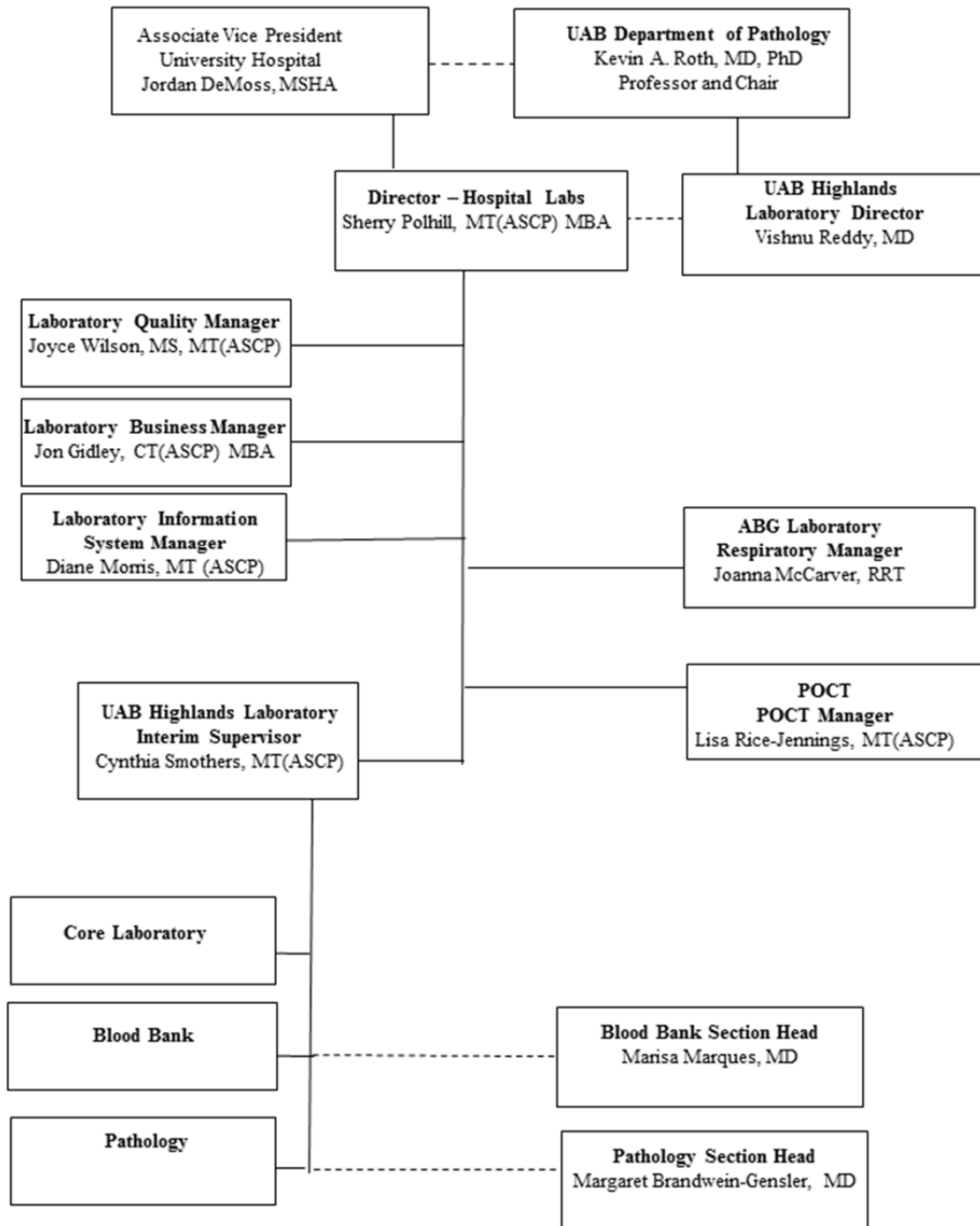
Updated 6/17/13

University of Alabama Hospital Laboratories TKC Outpatient Lab / Outreach Satellite Clinic Labs



Revised: 07/2013

UAB Highlands Hospital Laboratory Organization Chart



Revised 6/17/13

CLINICAL SPACE/VOLUME/CHARGES/COLLECTIONS

Anatomic Pathology – 35,327 sq. ft.

- North Pavilion - 12,527 sq. ft.
Surgical Pathology, Related Subspecialties, Frozen Room
- Parking Deck 6/FOT - 17,800 sq. ft.
AP/NP sign-out, Autopsy, Dermpath sign-out, AP Director,
Cytology sign-out, Cytology lab
- UAB Highlands – 5,000 sq. ft.

Laboratory Medicine – 42,878 sq. ft.

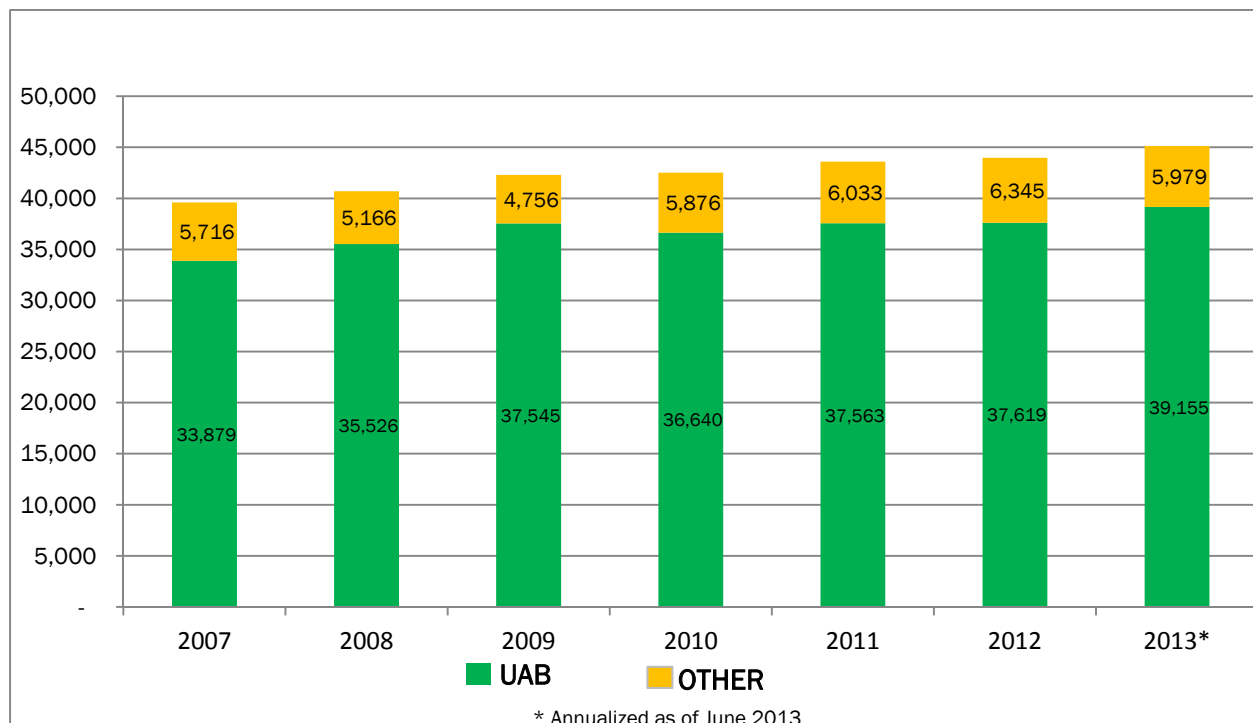
- Spain Wallace, Kirklin Clinic, West Pavilion, North Pavilion

Forensic Pathology – 12,915 sq. ft.

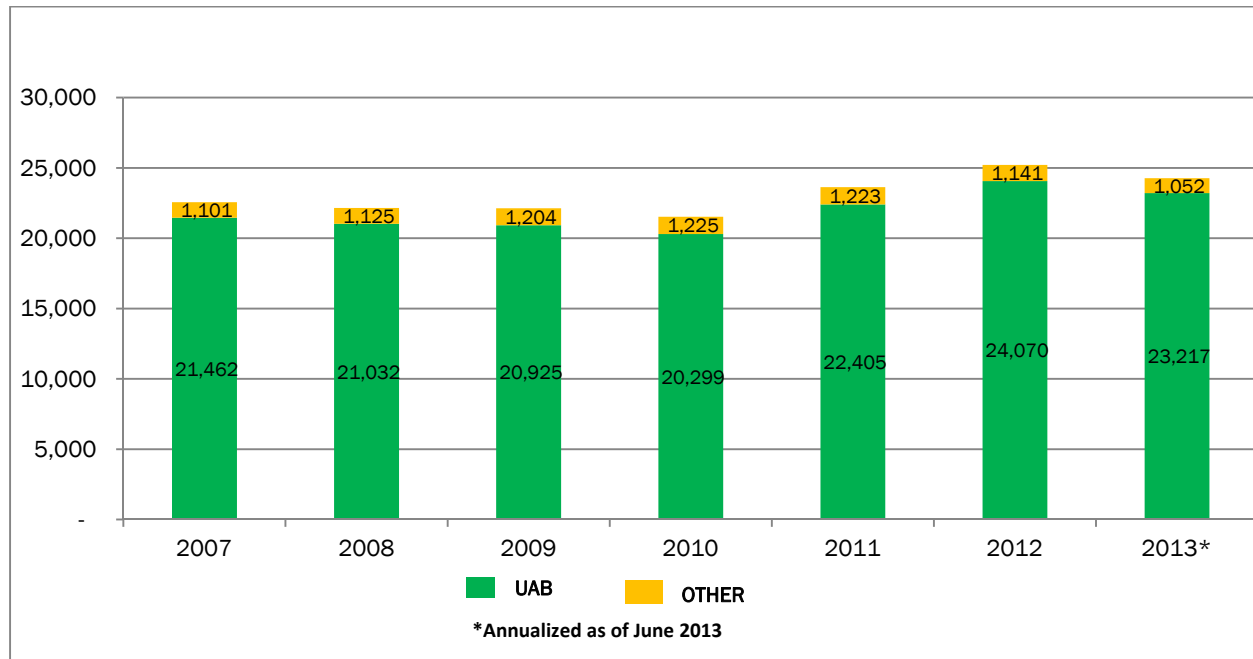
- Cooper Green Hospital

Total Clinical Space – 91,120 sq. ft.

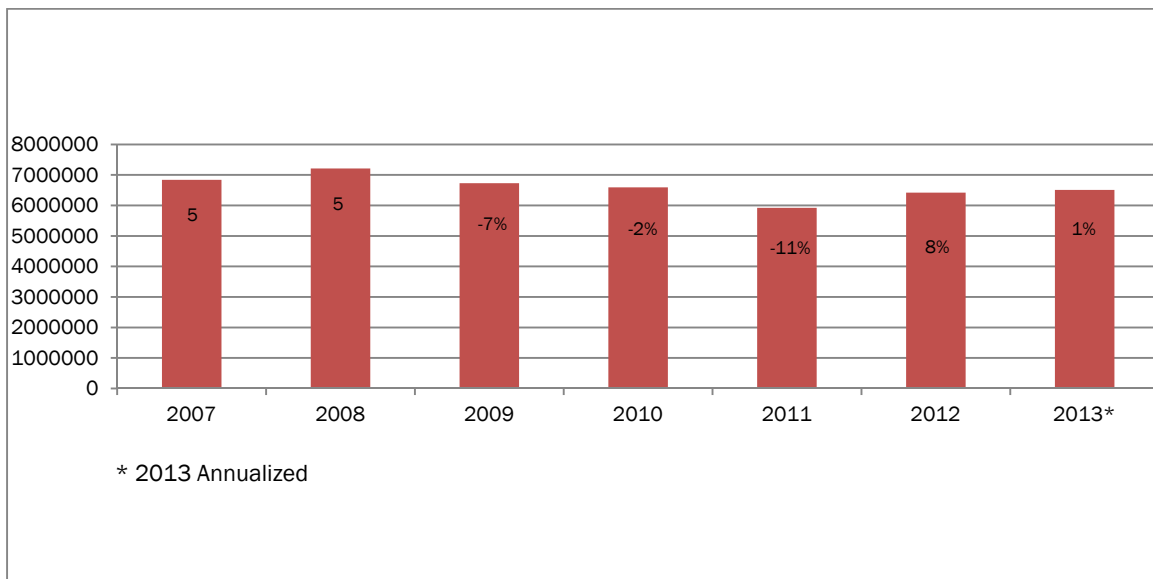
SURGICAL ACCESSIONS



CYTOLOGY ACCESSIONS



LABORATORY PROCEDURES



Decrease in volume for 2009 and 2010 is due to a change in the way chemistry procedures (profiles) were changed. Decrease in 2011 is due to decrease in Blood Bank procedures (-728,504), decrease in Bedside Testing within the Hospital (-155,504) and a shift to Point of Care Testing within TKC Clinics (25,053).

COMMUNITY PRACTICE PATHOLOGY PROGRAM:

Our new Community Practice Pathology Program (CPPP) is an innovative initiative that widens the business portfolio of the Department of Pathology. It also provides community hospital administrators, who contract for these services, with a depth of pathology services that are not available from community-based pathologists.

Our first contract is with Baptist Health, based in Montgomery (the State capital located 90 miles south of Birmingham). Baptist Health is a three hospital system (Baptist South [250 beds], Baptist East [150 beds], Prattville Baptist [50 beds]) and a Cancer Center. Baptist Health is affiliated with the UAB Health System, and our CEO, Dr. Will Ferniany, asked the Department of Pathology to initiate this business activity. His choice was determined by a need to provide Baptist Health with improved pathology services (i.e., better communication, higher level of trust by referring clinicians, broadened coverage beyond surgical pathology, decreased diagnostic turnaround times, and reduced send-outs).

A full risk contract, under the auspices of the University of Alabama Health Services Foundation (UAHSF) was executed in late July. The contract requires the Department to provide 3 full-time pathologists and to assume responsibility for clinical oversight of three clinical laboratories, frozen sections, and surgical pathology.

The benefits to the contracting entities are:

Department of Pathology

- Enhance revenue by sign out of >20,000 surgical pathology specimens per year
- Develop project management skills required to optimize pathology service delivery in a community practice setting
- Provide an academic practice environment for staff and trainees who prefer community practice
- Gain operational experience to reproduce the model in other locations

Baptist Health

- Retain skilled surgical pathologists on site with full back-up by the faculty of the Division of Anatomic Pathology
- Acquire laboratory medicine coverage at a service level not available from community practice pathologists
- Receive Transfusion Medicine and coagulation consultations from board-certified Transfusion Medicine physicians (24/7)
- Reduce inappropriate blood product use
- Provide continuing education for medical and technical staffs

UAB Health System

- Prove that an academic department is capable of integrating into a community setting at a service level required by the medical staffs and administrators in a multi-hospital system
- Provide an enhanced service level to meet an acute service and communication deficit in an affiliated hospital
- Provide the Department with a source of revenue to make up for loss revenue from other sources (e.g., State support and Federal grants/contracts)

There are many hospital systems in the State of Alabama that could benefit from contracting with the CPPP. With the help of the UAB Health System, the CPPP will identify other hospitals and health care systems desiring or requiring pathology services at the level that the CPPP is capable of providing.

VII. DEPARTMENT GOALS

VII. DEPARTMENT GOALS (2013 – 2018)

INTRODUCTION

The field of Pathology, traditionally considered as relatively aloof, conservative, and resistant to change, is undergoing an unprecedented period of stress, self-assessment and opportunity. Pathologists have been described as the “physician’s physician”, a somewhat flattering assessment that suggests an important role in educating practitioners of other clinical disciplines about disease pathogenesis and classification, but at the same time, portraying the pathologist as at best, an arm’s length away from real patients and actual clinical care. Similarly, investigative pathology, a once robust scientific discipline with numerous participants, finds itself in decline as former members redefine themselves as immunologists, neuroscientists, cancer biologists, microbiologists, and “other”. How then is an academic department of Pathology to position itself in this changing environment, to establish goals, and provide a vision for an uncertain future? I am now convinced that the future success of academic Pathology departments specifically, and the clinical and scientific discipline of Pathology in general, is no longer constrained by these previous limitations and the future lies with enabling disciplines such as informatics and new technologies which bridge the gap between the mechanisms of disease and clinical practice. Thus, Pathology requires redefinition and recruitment of a new breed of physicians and scientists who embrace new technologies and the active participation of Pathologists in precision medicine.



Traditional diagnostic training in anatomic and clinical pathology will remain at the center of this new discipline but new skills in computer sciences, statistics, big data management, comparative outcomes research, and public health will be required. The goal of the UAB Department of Pathology over the next five years is to become the recognized academic leader in this exciting “new” discipline. To accomplish our goal, we will need to develop new clinical revenue streams from an expanded Outreach Program and the nascent Community Practice Pathology Program, initiate new ventures such as “Integrative Pathology Informatics” to develop software and services to clinicians and patients; transition the Mitochondrial Medicine Laboratory from a purely translational research focus to a profitable national reference laboratory; strategically invest departmental reserves in high priority areas; strengthen our intellectual capital (i.e. students, staff, and faculty); increase our grant portfolio; and most importantly, partner effectively with UAB Medicine to garner the necessary resources to accomplish our shared goal of becoming the preferred Academic Medical Center in the 21st century.

Our departmental and divisional goals for the next five years are detailed below.

PROGRAMMATIC AND CLINICAL

Several key programs have been initiated in the past five years and are in different stages of inception, growth and maturation and have been discussed in multiple sections of this report. Each of these will require investments of new resources over the next five years to ensure their success.

➤ Web Computing in Informatics

Goal: Establish the Division of Informatics as the premier academic reference for Web Computing in the field of Pathology. This is the most rapid and cost-effective approach for advancing our biomedical

research and clinical goals. Web based computing is emerging as a cutting edge field in Big Data initiatives and we have an early competitive advantage.

➤ Integrative Pathology Informatics

Goal: Create an autonomous, self-sustained, service oriented unit tentatively named Integrative Pathology Informatics (IPI). IPI is envisioned as a complementary unit to the scholarly activities performed in the Informatics Division. It will be established to promote software development capabilities and deploy and deliver pathology informatics products (data/software) and service (web-based clinical decision support models).

➤ Advanced Integrative Data Structure

Goal: To develop an integrative data infrastructure that reaches from genomics core facilities to digital slide and radiographic images to the EMR. The commodization of health information systems is both a challenge and opportunity for the Informatics Division. We wish to develop an informatics infrastructure within the Department that consists of a mixture of in-house servers and cloud computing resources that will integrate data-rich information streams for clinical use.

➤ Mitochondrial Medicine Laboratory (MML)

Goal: To transition the MML from a translational research focused facility to a national clinical reference laboratory. Our initial investment in establishing the MML is beginning to pay off in the acquisition of extramural grant support for translational research in human bioenergetics. However, there is significant potential to develop a CLIA certified facility that is capable of performing high throughput testing of mitochondrial function in human blood samples. Direct links between human mitochondrial function and chronic disease susceptibility and progression are beginning to emerge. We currently lead the field in the development of these potentially meaningful and billable tests.

➤ Biorepositories

Goal: To enhance current Biorepository operations, recruit new leadership for the future, obtain CAP accreditation and CLIA certification, improve infrastructure and position our biorepository program to participate actively in precision/personalized medicine. We recently received a significant strategic investment from the UAB SOM and Health System to address the above goal over the next three years. We are grateful for this investment and look forward to achieving our objectives.

➤ Community Practice Pathology Program

Goal: To broaden the clinical business portfolio of the UAB Department of Pathology by providing on-site professional pathology service to community-based Hospitals. We have entered into our first contract with Baptist Health System in Montgomery and will place three full-time pathologists in their system. This arrangement will generate >20,000 surgical pathology specimens per year and provide opportunities for shared savings. This initial arrangement will provide us with operational experience to expand this program to additional sites throughout Alabama.

➤ Pathology Laboratory Outreach Program

Goal: To work collaboratively with UAB Hospital to establish a mutually beneficial Outreach program that will take advantage of under-utilized Hospital Laboratory capacity. The vast majority of successful academic departments of pathology have significant Outreach Laboratories that generate substantial revenues to support the clinical and academic missions. Despite multiple attempts, UAB has been unable to develop such a program.

➤ Molecular Diagnostic Laboratory

Goal: To expand our diagnostic capabilities to meet the increasingly complex and clinically relevant demands for next generation sequencing, epigenetic testing, and “-omics”. We will require at least one new full-time faculty member, several new technicians, new instrumentation, and expanded space to reach the “standard of care” provided by other academic health centers.

RESEARCH RELATED

Our five year goal is to return UAB to the top ten best NIH funded Departments of Pathology. To accomplish this goal, we will need to recruit at least two new NIH funded investigators per year in each of the next five years, retain productive research investigators, and replace retiring research faculty. Our initial focus will be to expand the research arm of the Division of Laboratory Medicine. Initially, through the appointment of a Division Director with a track record of NIH support and subsequently by expansion of faculty with interests in translational and clinical research in immunology, microbiology, and molecular genetics. Additional faculty with active research programs in informatics, neurodegenerative disease research, molecular neuro-oncology, cancer pathogenesis, and health disparities will be needed.



To improve our chances of recruiting and retaining NIH funded investigators, we will need to upgrade older laboratory space in Volker Hall and Ziegler Building (to allow for Biorepository modernization and expansion). Obviously, if alternative space is available in newly renovated buildings and/or new research buildings are built and laboratory space is provided to Pathology, renovating currently occupied space would not be necessary. The costs for space upgrade/construction are dependent on UAB's master plan and cannot be easily calculated by us.

To further enhance research in the department, we propose several new initiatives in the next five years. Departmental grants to support inter-divisional collaborations at both the “pilot” and “mature” level (eg. to support preparation of PPGs and P30s) will be needed. We will formalize a pre-submission grant review process. Faculty who participate in this program will be incentivized by relatively modest contributions to their discretionary funds. Faculty who fail to voluntarily participate in this program will be ineligible for departmental bridge funding. Finally, we will establish “New Direction” grants, for Pathology investigators redirecting their research programs or exploring exciting, but preliminary, new scientific foci.

TRAINING, MENTORING, AND EDUCATION

- Provide pathology support for undergraduates interested in doing summer research in Pathology laboratories. This could be run through the current SIBS Programs (which has the framework in place).
- Development of the new Biomedical Sciences Bachelors degree program to develop pathobiology and pathophysiology courses in this new curriculum. With the goal that these courses will be ultimately listed as bachelors level and masters level pathology courses.
- Continue supporting the trainee travel award and trainee research day. New appointment of senior Faculty to oversee integrated training programs.

- To increase the number of medical students interested in Pathology as a career and in doing research in pathology labs, request travel funds to present research (from a summer project or scholarly activity) at a Pathology meeting (ACLPS, USCAP).
- Fund all 32 ACGME general residency positions. Within five years, establish (and fund) a Fellowship in Medical Microbiology and a Fellowship in Pediatric Pathology.
- Support physician-scientist training at the residency/fellowship level by funding a full 1-2 years of research for selected residents who do AP-only or CP-only. This would help us attract residents who are interested in careers in academic medicine.
- Two annual awards for Clinical and Basic teaching mission for outstanding contribution to the mentoring and teaching missions.

SUMMARY



We have outlined a vision for the future of pathology and described the mechanisms and resources needed to accomplish our mission. This is an aggressive plan that emphasizes the strategic recognition of Informatics and innovation as the heart and soul of the future UAB Department of Pathology. We have an outstanding department that was formed on a foundation of “traditional” academic pathology values, strong basic science performed by NIH R01 funded investigators, and expert clinical service performed by diagnosticians trained in Anatomic Pathology and Laboratory Medicine. The 2018 UAB Department of Pathology will still retain elements of “old school” pathology; however, it will be a younger, more exciting and diverse department that embraces translational research,

interdisciplinary collaboration, a wide geographic clinical service area, and the integration of informatics and Big Data into all of its clinical and research initiatives. I look forward to the development of such a department over the next five years.

